The

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# The Southern Railway Contract.

THE decision of the directors of the Southern Railway Company to place a substantial order for the supply of twenty rotary convertors and sixty transformers with a Swedish concern because of its disapproval of the arrangements existing between certain British electrical manufacturers, has occasioned widespread discussion in the newspapers. The manner in which publicity was given to the decision may be in some measure responsible for the unusual extent of it, and for the wrong impression which may easily have been left upon the mind of some sections of the community unfamiliar with the necessities of the modern industrial situation. It is said that some small blame rests elsewhere for what may be individual mishandling of the matter, a circumstance which might be quoted, if it were necessary, in demonstration of the individual freedom which exists however complete the compact between members of a group may be.

The official versions of the matter, as prepared by some of the various interests concerned, are set forth in detail in later pages, and they need not be repeated here. So much has been published by us lately regarding the present industrial situation, both from our own collected information and from the annual statements made by the B.E.A.M.A. Council and its chairman, and the speeches delivered at meetings of electrical manufacturers, that readers of the ELECTRICAL REVIEW, whether as purchasers or producers of electrical machinery and plant, may be regarded as familiar with the arguments showing the need for co-operative action if we are to be assured security and efficiency for these departments of the industry.

It has become fairly generally recognised that combinations or amalgamations of, and agreements between, different producers in the same industries, also inter-industrial connections, have become an essential factor of life in British, American and Continental industrial communities because they conduce to efficiency of product and of production, more satisfactory wages and employment, and a fairer return on

capital. This is subject to the qualification that such arrangements do not operate harshly against the common interest or stifle reasonable and legitimate competition or savour of a policy of "dictation" likely to irritate and antagonise purchasers, however large or small. Those of our readers who can recall the cut-throat competition of pre-cooperative days, with the resultant small return on capital, will not need to think twice regarding the desirability for employing measures to avoid a return to such a state of affairs.

It is in respect of the nature of these measures that the Southern Railway controversy has arisen. The record of that railway was so consistently satisfactory in support of British electrical industry previous to the present incident that one is driven to regret still more than ordinarily the departure from its patriotic utilisation of the services of British manufacturers and British workpeople. That departure would appear to have been made somewhat hastily—we will not say petulantly—and seemingly some injustice has been done to British concerns. The manufacturers who were invited to tender indicated the best that they could do individually, as we understand it, and it was open to the Railway Company to approach others who are considered to be well able to meet the specification. The statement of the Railway Company, which we print elsewhere, was issued in London at a date when the invited firms had submitted further modifications to meet its wishes and criticisms, so that the statement itself was at the time it was published not a correct representation of the position. To the criticism that one manufacturer was willing to abandon certain stipulations on condition that he received another part of the contract, there is the very pertinent reply that conditions regarding part of the contract were also made by the Swedish Company and accepted by the Railway Company. And the unwillingness of the latter to open the tendering to firms other than the invited three because it desired to standardise on a type of machine already installed seems unjustifiable when one remembers that in the final event the company has actually made that change by introducing a fourth from abroad. It is difficult to imagine that it was seriously believed that the three uninvited concerns could not meet the specification.

We have dealt in the foregoing, and in our report of the details, with the principal points in the affair as we understand them, while admitting that there may be some considerations affecting the original tendering with which we are unfamiliar, and in conclusion can only repeat our regret that the Southern Railway should have felt it necessary in this case to depart from its excellent practice of using British equipment. Railways as such can hardly with consistency reproach others for appreciating and availing themselves of pooling arrangements, and we believe that if they can anyhow find it possible to come into closer conference with British electrical manufacturers and appreciate a little better the conditions of competitive production, they will find that from grouped operations they can probably secure more efficient results than from unrestricted competition. The principle of co-operation in connection with railways, mines, the chemical industry, and other departments of activity, involves all kinds of understandings and arrangements, and the application of railway principles in the electrical industry is by no means new. It is far from being the desire of British electrical manufacturers, whether grouped or operating individually, to antagonise the railway or any other public authorities. What all need to do at the present time is to operate unitedly, reconciling conflicting interests, as far as practicable, for the well-being of the nation as an industrial one.

Possibly there has been fault on both sides in the present case, and we may hope that somehow or other the features that have occasioned the breach of good relations may be removed so that the railway companies and corporations of the kingdom will utilise the services of British industry rather than go abroad for their requirements.

**"The Electrical Retailer and Dealer."**

THE April issue of this publication is being distributed along with this number of the ELECTRICAL REVIEW, and it is also being circulated widespread separately amongst the large class of electrical retailers from end to end of the United Kingdom. Evidence is reaching us that it is fast establishing its position; its value to those for whom it is produced is well recognised, and it is bringing orders to manufacturers and traders. In addition to its usual section particularising suitable selling lines for across-the-counter trade, it deals editorially with various matters of topical and news interest, and contains signed articles on "The Electrical Retailer's Banking Account," "Price Tickets," "Practical Advertising," and "Selling on Deferred Payment Terms."

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**Belgian Foreign Trade.**

THE statistics of Belgium's foreign trade in electrical goods, which we publish on another page, show that the imports of dynamo-electric machinery, though dwindling, are still larger than the exports, which at the same time showed an advance in 1926 of about 75 per cent. over 1925.

Of cables, submarine and underground, Belgium imported last year only a little less than she exported, but it is disconcerting to notice that, whereas her imports from Great Britain were negligible, her exports to Great Britain amounted to 1,650.000 kg., as compared with 415,000 kg. in 1925. Belgium is advancing strikingly as an exporter of insulated wire and cable, as an examination of the figures will show. She still purchases large quantities of porcelain insulators from abroad, but France and Germany do the bulk of the trade. Last year she nearly trebled her exports of telegraph and telephone apparatus. Looking at the record of electrical exports as a whole, it is noteworthy that Belgium is extending her sales not only with her own Congo colony, but also with South America, Australia, and China.

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**Swiss Railway Electrification.**

RECENT criticisms on the financial situation of the Swiss Federal Railways have resulted in some very interesting articles in the Swiss daily papers. From more than one of these articles details can be gleaned which go to prove that, far from the electrification of the State Railways being an error of judgment, it is incontestably an advantage from every point of view.

For instance, the development of hydro-electric works in Switzerland is in close correlation with the increasing needs of the Federal Railways. Ever since 1904 the latter have been studying the scheme of electrification now in process of completion, and in 1913 they voted a sum of 38 million francs for the first line electrified. In 1920 the first electric locomotive passed through the St. Gothard, and in 1925 the power produced by Swiss hydro-electric works had leaped from the 800,000 h.p. of 1912 to 1,850,000 h.p.

Again, it has been represented to the Federal Railways that by the time the present electrification is finished in 1929, their debt will be augmented by over 550 million francs. But the interest on this sum will be easily covered, according to the most stringent calculations, by the annual economy in combustible, rolling stock and staff: at least 26 millions a year will be saved on coal, 5 millions on rolling stock, and 12 millions on staff, making a total of 43 million francs.

Up to the present the Federal Railways remain obstinately impenitent, and rightly so, on the subject of their electrification, and appreciation of the improvement increases daily.

# The Poplar Electricity Undertaking.

**A brief record of the undertaking and descriptive features of the "Lopulco" pulverised coal-fired boilers, 12,500-kVA turbo-generator, and 6,600-volt switchgear installed in the new generating station.**

NOTABLE as a ship-building centre 300 years ago, Poplar became a metropolitan borough in November, 1900. To-day its area of 2,327 acres, which supports a population of 162,618, has a rateable value of £996,400.

When Mr. J. Horace Bowden, M.I.E.E., M.I.Mech.E., became engineer and manager of the electricity undertaking in 1904, he commenced the replacement of the original d.c. generating plant, which was commissioned in 1900, by 3-phase, 6,600-V turbo-generators, which were added to from time to time until the generating capacity had reached a total of 16,000 kW in 1922. Then, following visits to the Continent of Europe and the United States of America, Mr. Bowden commenced to plan a new station, the inaugural ceremony of which was performed on Monday last by Sir Andrew Duncan, M.A., LL.B., chairman of the Central Electricity Board.

The present capacity of the two stations is 26,000 kW, the new one consisting of one 10,000-kW set with three pulverised-coal-fired boilers, and provision has been made for a further extension of 15,000 kW. The estimated capital commitment of the undertaking at March, 1927, was £684,760, or £26.3 per kW installed. The load factor of the supply generated is approximatelv 31 per cent., and it is estimated that 34,250,000 kWh will be sold during the year 1926-27, excluding reciprocal supplies, at an average charge of 1.62d. per kWh; the fuel consumption is approximately 33,000 B.th.u. per kWh delivered to the feeders, or 3.5 lb. per kWh sold, at an average cost of 39s. 3¼d. per ton delivered.

The whole of the generating plant installed between 1899 and 1908, excepting three 20,000-lb. boilers, has been scrapped to make room for subsequent extensions. The site of the new station is in proximity to the older one in Glaucus Street, and a canal facilitates the delivery of water-borne coal and also provides condensing water; all the work was carried out to the specification of the main contractors, International Combustion, Ltd., in conjunction with Mr. J. H. Bowden. Two grab cranes on the wharf, one steam and one electric, unload the barges and deliver coal to hoppers for storage or for feeding through a Simon or alternatively a motor-driven Avery scale, a motor-driven magnetic separator, the elevator and conveyor systems to the two main bunkers. The gravity bucket elevator, supplied by the Mitchell Conveyor and Transporter Co., lifts the coal through a vertical distance of 70 ft. and discharges it into the raw fuel bunkers. The pulveriser house contains plant made by International Combustion, Ltd., and also the East Ferry Road Engineering Co. The two "Lopulco" dryers are of the rotary steam-heated type, driven by totally-enclosed variable-speed d.c. motors through reduction and bevel gear. The two Raymond mills are each capable of pulverising 12,000 lb. per hour, so that 85 per cent. of the ground product passes through 100-mesh and all passes 40-mesh screens; each mill is fitted with an exhauster fan with an air duct system, by means of which the mixture is conveyed to the cyclone separators.

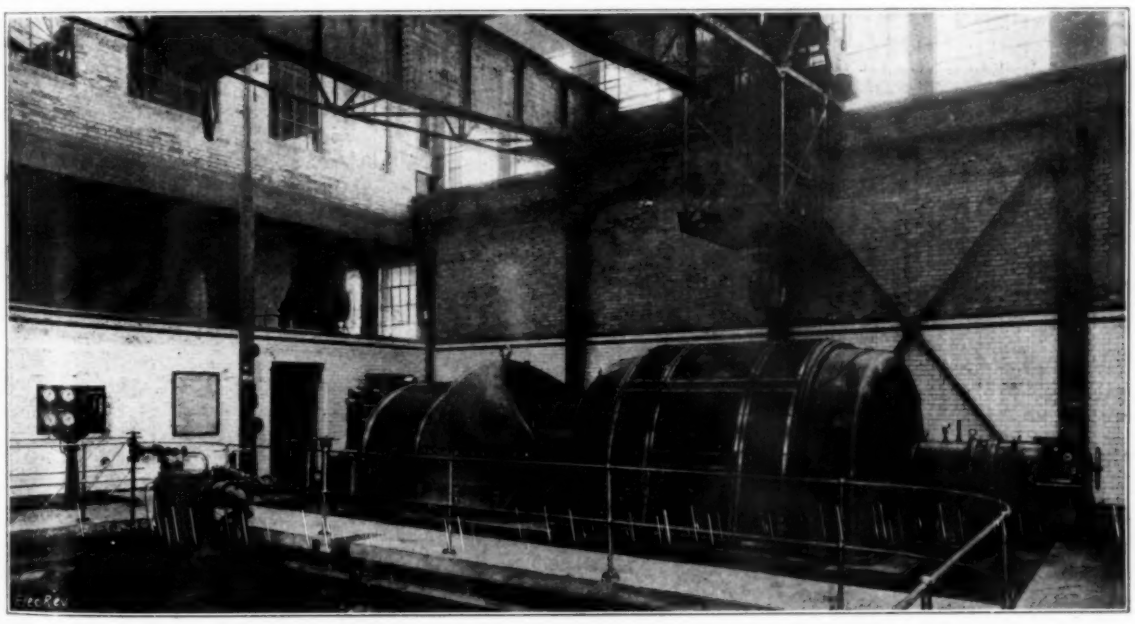

Fig. 1.—The 12,500-kVA Steam Turbo-generator Set in the New Poplar Power Station.

The Bradley pulverising installation was constructed by the East Ferry Road Engineering Co. The raw coal from the bunkers is passed through an automatic feed arrangement on top of the dryer, which is of the rotary type, containing a vertical series of trays, over which the coal is distributed during its passage; drying is effected by means of waste gases from the boiler flue, which are passed through the dryer by a fan and escape to the stack. The gases are cooled

before entering the dryer to prevent ignition of the coal and an auxiliary inlet prevents recondensation of the moisture driven off by the coal; the dryer has a capacity of 4 tons per hour. The dried coal then passes to a belt-driven three-roll mill capable of pulverising 3½ tons of coal per hour to such a fineness that 75 per cent. will pass a 200-mesh sieve and 95 per cent. a 100-mesh sieve. The pulverised coal is passed by a short screw conveyor through a dust separator to a cross screw conveyor having a capacity of 10 tons per hour, which discharges to the vertical bucket-type elevator which delivers the coal to the main screw conveyor that carries it to the three storage bins situated at the top of the boiler house, one over each boiler. There are five burners to each combustion chamber, and the five corresponding feeders are arranged in one group, driven by a variable-speed motor, which enables the feeder to be run at any speed between 35 and 140 r.p.m.; each feeder screw is operated through a clutch and may be isolated from the group. A primary fan is provided for each group, having an output of 3,500 cu. ft. of air per minute against a static load of 16 in. w.g., the temperature of the air being 300 deg. F. The fans are located on the feeder floor and air is drawn from the air-heater duct.

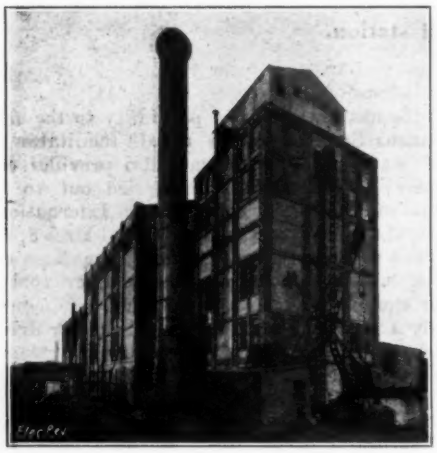

Fig. 2.—Pulveriser House and Thomson Chimney.

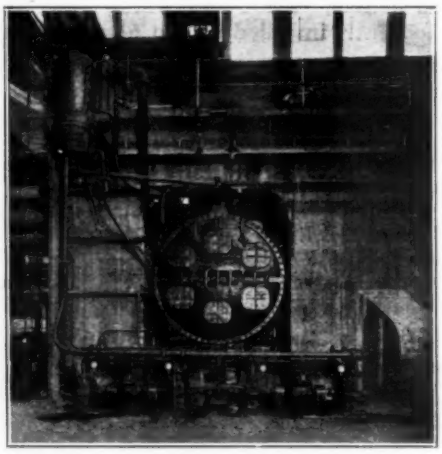

Fig. 3.—Condensing Plant.

The boiler-room equipment at present consists of three units by the Vickers Boiler Co., each designed for a normal evaporation of 50,000 lb. per hour and an overload evaporative capacity of 70,000 lb. per hour, these figures being actual evaporations. The working pressure is 325 lb. per sq. in. and the final temperature of the steam 700 to 714 deg. F.; two boilers are of the standard cross-drum steel-cased design and one of the double-circulation type; the heating surface of each is 6,200 sq. ft.

Feed water is supplied to the boilers through Foster economisers supplied by the Power Specialty Co., Ltd., each having a heating surface of 2,196 sq. ft., raising the temperature of the water to 240 deg. F. and reducing the flue-gas temperature to about 540 deg. F. Each boiler is equipped with a superheater of 3,950 sq. ft., supplied by the Ferguson Superheater Co., Ltd. The air for combustion is preheated by "Usco" plate-type heaters manufactured by the Underfeed Stoker Co., Ltd.; each consists of 80 elements 11 in. long, giving a heating surface of 6,950 sq. ft., and under normal conditions raises the temperature of the air from 60 deg. F. to 260 deg. F. whilst reducing the flue-gas temperature from 540 deg. F. to 340 deg. F.

The combustion chambers follow standard "Lopulco" practice, being provided with the usual water screen and water-cooled rear-wall elements. The secondary air from the preheater is admitted to the side walls, which are hollow, and the air is still further preheated before entering the combustion chamber. Air for combustion is supplied by a forced-draught fan in the basement, capable of delivering 30,000 cu. ft. per minute at normal temperature against a static head of about one inch water gauge; the air is discharged through the preheater to the primary fan suction at the feeder level and to the secondary air-ports in the combustion chamber. The products of combustion, after passing through the economiser and air preheater, are discharged by the induced-draught fan to a main flue at basement level which is common to all three boilers and connects with a steel chimney outside the boiler house. Each induced-draught fan is driven by a two-speed motor and is capable of dealing with 45,000 cu. ft. of flue gas per minute at a temperature of 380 deg. F. against a static head of 3-in. water gauge. The fans were supplied by Musgrave & Co.

Fig. 4.—New Boiler House: Burner and Operating Floor.

A sluicing trough in the basement floor transports

the ashes to a pit outside the boiler house, where they can be handled by a grab crane and loaded into wagons. The water-circulating system is self-contained, the

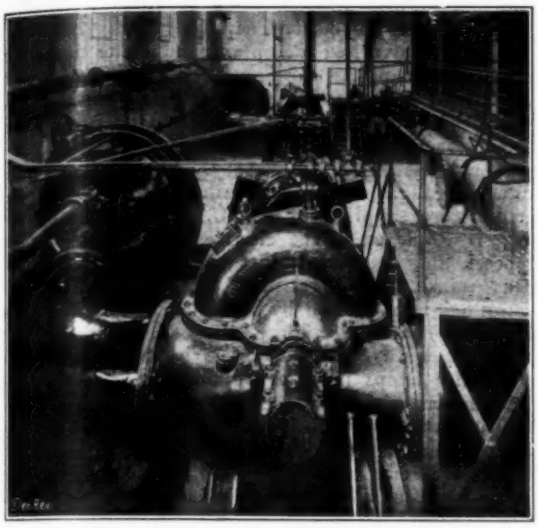

Fig. 5.—Condenser Circulating Water Pumps.

motor-driven pump being in a pump house adjacent to the ash pit and drawing its supply from a culvert fed through a metal screen from the ash pit. The ash system was supplied by the Underfeed Stoker Co., Ltd.

A pure feed-water supply has been provided for by the installation of a Vickers flash evaporator for breaking the raw water, and a "Contraflo" de-aerator for the treatment of all water passing to the boilers. The evaporator obtains its steam supply at a pressure of 30 lb. per sq. in. absolute through an 8-in. bore bleeder connection from an intermediate stage of the main turbine, and under normal working conditions vaporises 3,500 lb. of water per hour. The vapour is condensed in the low-pressure feed-water heater and enters the condensate system as make-up feed water by being discharged through a steam trap to the condenser. The de-aerator is between the surge tank and the feed pump suction, the steam for the heating element being provided by the feed pump exhaust at a pressure of 10 lb. per sq. in. gauge; under normal full-load conditions it treats 109,100 lb. of feed water per hour.

Provision has been made for utilising the steam generated in a destructor plant, situated on an adjacent site, in the new station; it is intended to connect this steam to an auxiliary heater between the feed-pump discharge and the economiser inlet connection; the condensed steam will be taken through a steam trap to the l.p. heater and thence to the condenser, so that in addition to supplying feed-water make-up, it will also be used for feed-water heating. It is anticipated that when this steam becomes available it will be unnecessary to have the evaporator in service, and an alternative source of steam for the l.p. feed heater will be bled from the main turbine at a pressure of 9.6 lb. per sq. in. absolute, when the evaporator is not in use. The feed system is entirely closed; the two pumps, by J. & G. Weir & Co., Ltd., are turbine-driven, and each is capable of supplying the whole of the feed required under normal conditions; the pump turbines exhaust to atmosphere when the de-aerator is not in use, and excessive back pressure is guarded against by an atmospheric relief valve. When the auxiliary heater is in service, the feed water will be further pre-heated to a temperature of about 220 deg. F. before entering the economisers. Automatic feed regulators of the Crosby type are fitted; the feed heaters are of the floating head type, by Caird & Rayner, Ltd.

The turbine room was designed to house two sets ultimately; one set has been installed by the General

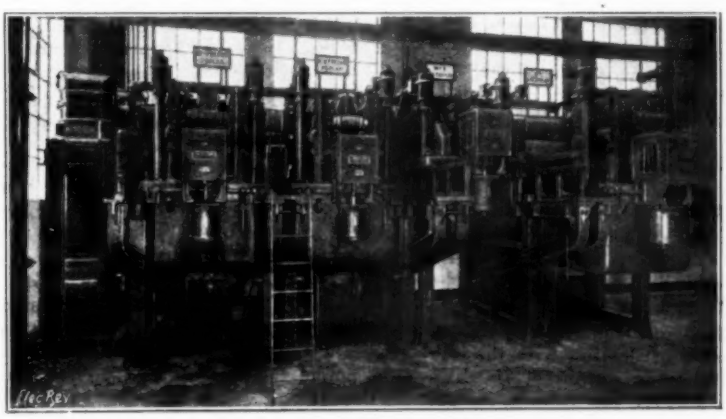

Fig. 6.—The 6,600-Volt Switchgear.

Electric Co., Ltd. Its output is 10,000 kW at a power factor of 0.8 (or 12,500 kVA), 6,600 volts, three-phase,

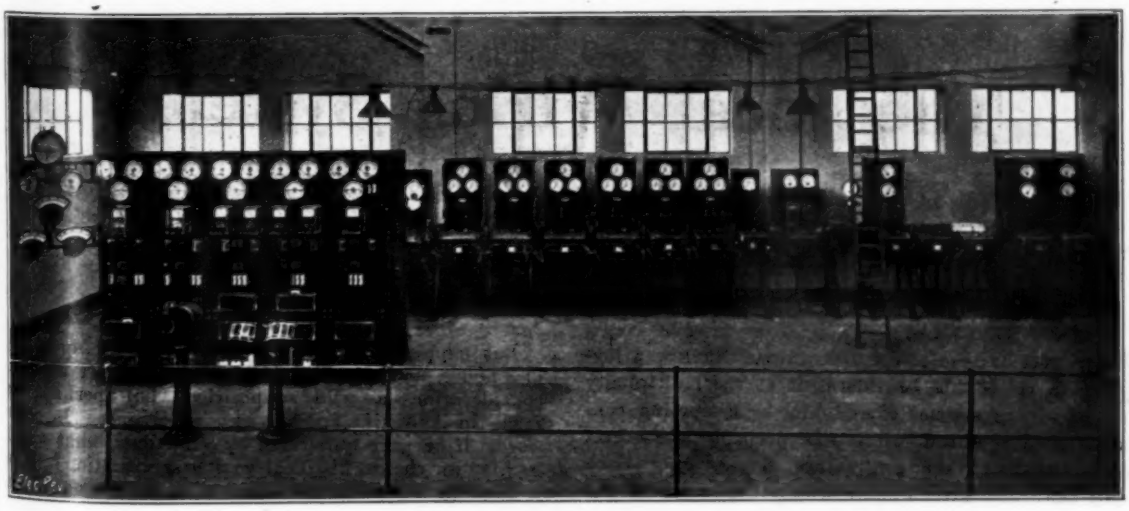

Fig. 7.—Station Control Gallery: E.H.P. Board on Left, House-service Board in Background.

50 cycles. The turbine is of Fraser & Chalmers' standard high-pressure 3,000-r.p.m. design, and it

operates at a steam pressure of 300 lb. per sq. in. and a total temperature of 700 deg. F.

The generator is capable of carrying a 25 per cent. overload for two hours; its stator, weighing 40 tons, was cast in the foundry at the G.E.C. Witton works; mica insulation is used throughout the stator, and a totally-enclosed system of ventilation has been adopted, the air being circulated by means of external fans driven by a G.E.C. motor of 110 h.p. in the basement, with a surface cooler through the tubes of which the condensate and make-up feed water is passed.

The surface condensing plant was manufactured by Vickers, Ltd.; of the "Contraflo" type, it has a cooling surface of 14,500 sq. ft. and maintains a vacuum of 28 in. at normal load. The circulating water pumps were supplied by the Mirrlees Watson Co., Ltd., and have a capacity of 9,000 gallons per minute, with water at an inlet temperature of 75 deg. F.; the motors are each of 150 h.p., 415 r.p.m., squirrel-cage type, and the auto-transformer control gear is mounted at one end of the pump house in the form of an industrial panel, provided with busbars and isolators, by Brookhirst, Ltd. The smaller pump motors in this section are of the "Metrovick" squirrel-cage type with auto-transformer starters.

The main 6,600-volt switchgear in the new station comprises six "Metrovick" electrically-operated oil circuit breakers of the metal-clad type with duplicate busbars. A field control pedestal and a neutral earthing cubicle are provided for the alternator; no earthing resistance is provided, and the neutral is connected solid to the earth plate outside the station.

The breakers are of the K4 type, and each has a disruptive capacity of 500,000 kVA; Merz-Price balanced-current protective gear has been provided for the alternator and the station auxillary transformers, and balanced-voltage protective gear for the feeders, with a three-pole overload relay on each of the two feeder groups, having an inverse time characteristic with an adjustable definite minimum time of operation for discriminating. The telegraph equipment is of the Chadburn type, and the loud-speaking telephones by Graham & Co.

Each of the two "Metrovick" transformers is capable of dealing with the total auxiliary plant load; each has an output of 750 kVA at a power factor of 0.8, and the low voltage is 450 V three-phase, with 3 and 6 per cent. tappings up and down on the high-tension side; they have been erected outside the station.

The l.p. switchboard was supplied by George Ellison, and is divided into three groups: all switches are of the draw-out type with single busbars. One group of ten panels is for the a.c. equipment and lighting, the second group is a three-panel equipment for the three-wire d.c. supply, and the third group is a two-panel equipment for the battery supply.

For the pulverised-fuel plant and boiler house the motors were supplied throughout by Veritys, Ltd., and range from 1½ to 80 h.p.; both slip-ring and squirrel-cage types are represented for use on the three-phase system, as well as d.c. machines for use where variable speed requirements are necessary. For the forced- and induced-draught fans and Bailey water screens, the motors were supplied by G.E.C. Brookhirst switchgear is employed. The electrical equipment for the Babcock and Stothert & Pitt cranes is of "Metrovick" make. The lighting of the turbine and boiler houses has been effected by means of Benjamin dispersive fittings carrying high-candle-power gasfilled lamps; various alleyways and passages have been illuminated by smaller lamps in water-tight fittings.

All motors with their control gear exceeding 45 h.p. are connected up with paper-insulated, lead-covered, single-wire-armoured cables supplied by Glover and Co., Ltd. For motors below 45 h.p. and for the whole of the lighting circuits, the "Maconite" system has been employed, single-core cables for lighting and four-core cables for motors having been supplied by the Macintosh Cable Co., Ltd.; the fourth core has been utilised for earthing the frames to the earthing bus which encircles the station on every floor, and is thence connected to the earth plate. The wiring has been carried out by the Alliance Electrical Co. The distribution boards controlling the sub-circuits were supplied by Parmiter, Hope & Sugden, Ltd., and a lift is being installed between the basement and the bunker levels by Waygood Otis, Ltd.

The main interconnecting cables between the old and new stations are of the paper-insulated, lead-covered and served type supplied and laid by Glovers, Ltd.: there are four, each having a cross sectional area of .35 sq. in., laid in Sykes earthenware ducting supplied by the Albion Clay Co., Ltd. A pilot cable is provided with each main feeder for protective purposes and connects with the Merz-Price gear at both ends.

In conclusion, it may be noted that in 1908 an arrangement was entered into with the neighbouring borough of Stepney for linking the e.h.p. systems of both undertakings. Subsequently the boroughs of Hackney and Shoreditch joined the link, with the result that for many years this interconnected group of undertakings has sold energy at average prices which are amongst the lowest in London.

# The Ideal Wiring System.

**A comparison of the several wiring systems that are available, with a view to deciding which, in the author's opinion, approaches nearest to his ideal for ordinary domestic wiring.**

By H. R. TAUNTON.

IN a recent issue of the Electrical Review a layman voiced his bewilderment at the multiplicity of wiring systems offered him by competing contractors. He echoed what was probably the secret bewilderment of the contractors themselves. Each would naturally extol wholeheartedly the merits of the particular system he put forward—put forward largely for the sake of a "different" talking point—but while his praise might be temporarily sincere, it would inevitably be biased by the underlying consideration of competitive cost.

But suppose he were considering the wiring of his *own* house, and, further, suppose expense were a minor consideration—a wild supposition, but perhaps an uncle in Australia has left him a fortune. In other words, if he were unfettered by conditions, what would be his own choice, his ideal wiring specification? It is a question on which few will find it easy to come to a definite decision; and the eventual decisions would make an interesting symposium—if one could ensure a symposium of contractors only, uninfluenced, directly or indirectly, by the contributions of makers' representatives, each with his little axe to grind.

My own ruminations on the question have been clarified into the present article, and in their course have probably reflected the general trend of the more or less indefinite ideas of most contractors of any experience, however few may be found to agree with my personal conclusion.

When I was first introduced to a "married joint"—almost unknown to the modern wireman—a quarter of a century ago, the one popular system of house wiring was casing and capping, with compo. bends. Conduit was in its infancy, and for heavy work screwed gas-barrel with special cast-iron boxes was commonly employed, a clumsy, expensive, but quite efficient forerunner of heavy-gauge conduit. Concentric systems were known, and various forms of armoured cable were already on the market; and there were, of course, any number of freak systems used by individual contractors, which have died a natural and unregretted death.

One of these, which I often came across in Scottish country houses, had certain merits. It was the speciality of the late Mr. R. F. Yorke, and consisted of a single v.i.r. wire run in compo. tubing with a bare-wire earthed return. We were less critical in those days, and its obvious merits of simplicity and economy appealed to me—until I happened carelessly to handle a terminal while standing on the damp floor of a battery room.

The present legion of "surface" systems were, I think I am right in saying, unknown twenty-five years ago. Ordinary single and twin lead-covered wire was, of course, in use—usually without any attempt at bonding—but the first special house-wiring system of that kind which I can remember, I came across in Dublin in 1902 or 1903. It was made, I think, by the B.I.W., and consisted of flat conductors, paper-insulated and lead-sheathed. In such installations as I saw, no attempt had been made to seal the ends; and in the humid Irish atmosphere some of the later tests must have been interesting!

The next landmark in my wiring experience, apart from the gradual popularisation of simplex and similar conduit systems, was the introduction of Stannos. I think it must have been one of the earliest of the practical surface systems. In pre-war years I wired a number of London police courts in Stannos, to the specification of the Scotland Yard architect, and it certainly made a neat and workmanlike job, provided the work was done by men with some experience in its handling.

Since the war, surface systems galore have been marketed. Every cable maker—almost every electrical manufacturer—has managed to extract from his advertising man something novel in the way of nomenclature, and then produced something not quite so novel in the way of wire to back it up. (A contractor, with a little jointing, could almost wire a six-room house with his accumulated samples.) It is as impossible as it would be invidious to name all the various makes from which the modern contractor can make his embarrassed choice; and equally is it impossible to discuss them all in detail—and quite unnecessary: they are all much of a muchness, with a few exceptions which, in striving after originality, hardly escape a certain freakishness. The difference between the best and the worst of them is the difference between Tweedledum and Tweedledee. And from one point of view the same can be said of any wiring system, from the flex-and-button system favoured on the Continent to the massive ironclad system on which the Admiralty lavishes the taxpayers' money.

That is not the paradox it may at first sight seem. For electricity is so safe, wiring for safety is so simple, that almost any conductor, insulated and protected in almost any way, will, *if properly installed*, give a margin of safety infinitely higher than is attainable with gas or any other illuminant. I should doubt if electrical fires are markedly more common in France than they are here, though French wiring methods would give spasms to the meticulous gentlemen who draft the I.E.E. wiring rules. The truth is that our rather fussy regulations still too much reflect the ignorant awe with which the novelty of electric lighting was regarded by our Victorian ancestors. They are conceived too much in the spirit of the red flag which so long handicapped the progress of the motor-car.

A careful workman can make a wiring installation safe with any system; just as a slovenly man with the most gilt-edged one can contrive a potential volcano. All the twelve dozen rules of the Institution can never take the place of care and commonsense; nor can the mere multiplication of regulations close every loophole against the unregulated whims of Fate. Their only tangible result is a needless handicap to the popular extension of the uses of electricity.

In short, one system is as good as another, once it is properly erected, within reasonable limits, of course, and under normal conditions. I am not trying to maintain, for instance, that bare-wire on insulators, excellent under the high roof of a workshed, would be equally so along the skirting of a bathroom. I am only looking at the question now from the point of view of safety—safety from fire, shock, or breakdown—and disregarding for the moment the less important points of permanency, flexibility, convenience, appearance, and so on. From that point of view, the one superlatively important point of view, the true criterion by which any system should be compared with its rivals is the degree to which it reduces the possibility of poor workmanship producing dangerous results.

A system which can be made safe by the ordinary skill and care of the average wireman is therefore to be preferred to one which needs the handling of a master craftsman; and by the same reasoning, one which only gross clumsiness and negligence could make dangerous would be better still, and so on, towards the unattainable ideal of "foolproof." Despite the optimism of switchgear makers, "foolproof" is an absurd interloper in the electrical dictionary. There is nothing foolproof in this world. You might think a common brickbat was—until somebody dropped it on your head!

If, then, we examine the more popular systems of wiring from this standpoint—the scope they give to faulty workmanship—and at the same time glance at their merits and demerits on minor points, we shall, I think, be able to come to something like a definite conclusion. Undue weight given to these minor points—appearance, adaptability, &c.—might lead to widely differing conclusions; but if "safety first" (the average expectation of safety when erected by ordinary workmanship in normal conditions) be made the acid test whereby to judge competing systems, the issue will be greatly simplified.

To analyse all the possible systems that are in use to-day would be an impossible task. Many of them differ only in their trade name; eliminating these and the freaks, and the systems designed for special conditions, the remainder can be grouped in half-a-dozen classes:—

*a*. Heavy-gauge screwed conduit, more or less completely ironclad from main switch to fitting—generally "less"—it is rare to meet an installation in which the logic of the system does not lapse at a wooden fuseboard or a ceiling block or the like.

*b*. Light-gauge slip conduit, with or without continuity fittings of all degrees of complexity and inefficiency.

*c*. Casing and capping, wood or metal—often with the addition of metal or rubber bends.

*d*. Twin or single wires, metal-sheathed—usually some form of lead alloy. This includes the bulk of the "surface" systems, in which wires are clipped directly to surfaces without other mechanical support or protection.

*e*. Cab-tire, similar to the above, but with a sheathing of hard rubber instead of metal.

*f*. V.i.r., enamelled, or bare wire run on insulators or cleats.

It is safe to say that 99 per cent. of to-day's buildings are being wired on one or other of these six main systems. As, however, we are here concerned only

with domestic wiring, we can eliminate *f*, which, though often the best possible system for factories and similar buildings, where it can be run out of reach, is hardly suitable for a drawing-room. It is true that many a house has been, and is still being, wired on the "threaded-joist" principle, with unprotected v.i.r. wires under the floors. No doubt consulting engineers will shudder at the thought of it, but there is really no reason why such wiring should not be safe and satisfactory if carefully done. Logically, v.i.r. wires touching wood only where they pass through joists should be even safer from fire risk than similar wires touching wood throughout the length of a wood casing system. There is here at least a suggestion of a possible approach to the problem of house wiring for the masses. However, it is not a system which a contractor, regardless of expense, is likely to choose for his own house, so we can dismiss it with the rest of *f*.

We can also dismiss system *b*—light conduit. Any merit it has except cost, which is not here in question, is obviously possessed in greater measure by *a*—heavy gauge—for which it is admittedly no more than a cheap substitute, although it probably rivals *d*—"lead-covered"—as the most popular of wiring systems.

I think, too, we can dismiss without much discussion *c*—casing and capping. Metal—usually sherardised steel—casing is little heard of to-day; nor is the more common wood casing used much by up-to-date contractors, except in special situations. Its neat erection needs a joiner's skill, which the modern wireman rarely aspires to. Its bulk makes it unsuitable for concealed work and often unsightly for surface work. In dry situations it has certain electrical advantages, and its fire risks are probably less than those of a poorly-earthed metal system. On the score of mechanical protection it is at a certain disadvantage; though in a private house that is a minor consideration. Its expectation of safety, given average skill in erection, is largely dependent on the care taken to keep wires apart at bridges, tees and angles, and on the avoidance of joints, to which it is rather a temptation. It is indeed a method best associated with the old tree system, where joints were a commonplace. The average wireman of to-day cannot be relied upon to make the sound soldered joints of his predecessor.

Despite its many good points, therefore, casing and capping cannot, in ordinary circumstances, be considered as in the running for to-day's ideal-system stakes. We are now left with three claimants only: *a*, heavy gauge; *d*, "lead-covered"; and *e*, cab-tire; and it will probably be conceded that most of the best domestic work of to-day is carried out on one or other of these three systems. In our search for the ideal, then, they require examination in closer detail.

Heavy-gauge conduit is the pet of the consulting engineers and, without question, it is the best system for most factories, public buildings, offices, and the like, where mechanical protection against accidental or malicious damage is an important consideration. It is, however, too often specified for factories where the less pretentious and very much less expensive system *f*—open wiring on insulators—would be really preferable; and it is, of course, unsuitable for very damp or corrosive atmospheres. In this article, however, we are only discussing domestic installations, and in them, as I have suggested above, mechanical protection becomes a question of quite secondary importance. I think, personally, too much stress is laid in wiring rules, specifications and practice on the necessity of protecting wiring—in private houses—from possible injury.

Consider the average domestic installation. If the wires are run on the surface, how are they in the least likely to be damaged, accidentally or wilfully, unless perhaps in an ill-regulated nursery? If the wires are concealed, how is a nail—the only probable cause of disaster—likely to reach the bulk of them, run below floor-boards? The wiring to plugs is usually protected by the skirting, and that to switches is usually run in an angle or by the architrave of a door, where nobody but a lunatic would want to drive a nail. There only remains the wiring to rare bracket points, in rooms so old-fashioned as to lack a picture rail. Certainly the aberrations of human intelligence call for some protection here—but not for armour-plating. To encase the whole wiring of a house in thick steel for the sake of protecting a few feet of wire against one chance in a million is like wearing a "tin hat" against the chance of the "foolproof" brick mentioned in an earlier column; or like a native of the Sahara living perpetually in a diving suit lest he be caught in the rain!

For domestic wiring, then, the mechanical advantages of heavy-gauge conduit are beside the point. Another great claim for the system is that it is "flexible"—that new wires can be pulled in and out when necessary for repairs or extensions. But how often is it necessary in a private house? And how seldom is it possible in practice! It presupposes a reasonable margin in the sizes of the pipes and an adequate number of accessible inspection boxes, ignoring the hazards of bad judgment in erection—to say nothing of the influence of competition. It also ignores the difference between handling old wires in old conduit and new wires in new conduit, and the possibilities, in repair work, of broken wires, stripped insulation and jamming. In short, so far as house wiring is concerned, the whole claim is a weak one. Actual disadvantages of conduit for domestic work are its unsightliness on the surface and its bulk if concealed, entailing heavy cutting away if rusting through the covering plaster is to be avoided.

*(To be concluded.)*

# The Landlord and Tenant Bill.

## New Rights for Traders.

By W. ERIC JACKSON, LL.B., Barrister-at-Law.

THERE seems little doubt that a certain amount of disappointment will arise over the terms of the new Landlord and Tenant Bill now before Parliament. Such disappointment is inevitable, not because the legislature does not desire to satisfy the reasonable demands of traders who are lessees, and whose misfortune on being ejected from their premises at the expiration of their leases is apparent, but because in many cases legislation cannot cover or avoid all the difficulties of the question.

It has long been felt that the iniquitous system whereby landlords, on the expiry of a lease, have been able to hold tenants to ransom by forcing them to pay extortionate sums for a renewal of a lease, ought to be abolished. But on the other hand, if every tenant is to become his own freeholder or, what is almost the same thing, be able to demand perpetual renewal of his lease, development and reconstruction of property will become impossible unless local authorities are given further powers to regulate building and town planning.

The root causes of the contention over leasehold reform seem to be (*a*) the increased values of land at the end of the lease, and (*b*) the covenant to hand over to the landlord the premises in a good state of repair.

The Landlord and Tenant Bill deals with both these points in a limited way. In so far as the increase in the value of the premises is due to the tenant's business activities, whereby a goodwill has attached to the property, the landlord ought not to make any capital out of it. But increases in land values arise from numerous other causes—for example, change in the character of the district—and if the value increases from such a cause and not from the tenant's business, the landlord is surely entitled to this rather than the tenant, just as the owner of any movable property of value is entitled to any increase in its market value.

In order to see how the Bill proposes to deal with these questions, a review of its terms is of interest. The Bill was not debated as was intended on April 4th, and doubtless the impending Budget discussions will cause the Bill to be postponed in its second reading for some time. Traders have therefore a useful opportunity meanwhile of acquainting themselves with its proposals, and of making any criticism they think fit.

The principal part of the Bill deals only with premises used for trade or business in England and Wales. In the case of premises used partly for business and partly for other purposes, the provisions in question apply only so far as the business part of the premises is concerned.

The rights of a tenant under the Bill are divided into two classes: (*a*) in respect of improvements to the property executed by the tenant, and which have increased its value, and (*b*) as regards loss of goodwill on quitting the tenancy.

Take class (*a*) first. The Bill only covers those improvements done after the Bill becomes law. The suggested date is September 30th, 1927, but will very probably be later than that. Accordingly, tenants who up till now have spent money on improving their premises will get nothing for their expenditure when their leases expire. To many persons this may appear a defect in the Bill.

After the Bill becomes law, any tenant who desires to make an improvement for which he may afterwards obtain compensation, must either get the consent of his landlord or, if the landlord objects to the proposed improvement, obtain a certificate from the appointed tribunal. The tribunal will only grant a certificate if it is satisfied that the improvement is reasonable. The landlord can avoid a certificate by undertaking to do the improvement himself in consideration of a reasonable increase of rent.

So far, then, tenants will have the power to prevent landlords from refusing reasonable improvements and to safeguard themselves from providing improvements entirely at their own expense for which the landlord will benefit.

The amount of compensation will be assessed at the expiry of the lease, and will in no case exceed the capitalised value of the increased letting value due to the improvement, or the cost of executing the improvement at the date when the lease expires.

A point of difficulty is created in the case of premises which are to be demolished or rebuilt in an altered form after the lease has expired. Obviously, if a tenant executes structural improvements, these will be of no value when the premises are demolished. Such cases will have to be carefully considered, and Section 1 (3) of the Bill goes so far as to provide that if the improvement will have no effect on the value of the property after demolition no compensation shall be payable to the tenant.

Somewhat similar provision is made later on in the Bill with regard to loss of goodwill. Where premises are to be demolished or altered, the tenant will be in the same position as now, and will have to leave his premises with no compensation. Of course, there are cases in which an improvement or goodwill will not be affected by rebuilding or only affected in a limited way. For example, a tenant may incur paving or drainage expenses. Such expenses will enure to the landlord's benefit after rebuilding. And if a shop is pulled down and rebuilt as a shop, goodwill may attach to the new premises by reason of the old business, but not if the new premises are converted into offices or a kinema. The Bill provides for the taking into consideration of all cases of this kind, but the whole basis of compensation is to be found in the answer to the question: What benefit does the landlord get by reason of the tenant's acts or business? If no benefit (as in the case of demolition), no compensation.

As regards goodwill, the problem is dealt with on the same basis as above, but the tenant's rights and the landlord's rights are a little more complex. The tenant, on claiming for loss of goodwill, may take the case before the tribunal. He will only be compensated for the increase in value of the premises due to his goodwill, and then only so far as that value enures to the landlord's benefit.

The landlord may meet the claim by offering a renewal of the lease on reasonable terms or a sale of the freehold at a fair valuation. Such terms or valuation will include any increase in value not due to the tenant's goodwill, as where the value has gone up owing to changes in the district.

The tenant can, as an alternative to claiming compensation, demand a renewal of the lease on reasonable terms. He can only make this demand if he shows that he is a suitable tenant and that no money compensation would adequately compensate him for loss of goodwill.

The landlord, in reply to the demand for a renewal, can avoid a new lease by showing that he wants the place for occupation by himself or a son or daughter, or that he wants to develop or reconstruct the property, or that a new lease would retard development of other property and be contrary to good estate management. In such cases the tenant will not get a new lease, but will be thrown back on his claim for compensation. It is somewhat unfortunate that the foregoing provisions are all applicable to business premises, but are not applicable to premises occupied by professional men.

The remaining part of the Bill deals with all tenancies and attempts to tackle the "covenant to repair" problem by enabling all disputes over the amount claimable for non-repair to be referred to the tribunal.

The exaction of money payments by landlords for granting a licence to assign, sublet, alter the user of the premises or execute improvements is expressly forbidden by the Bill. Consent to an assignment or subletting or improvement is not to be unreasonably withheld. The landlord may, however, claim, in the case of improvements or alteration in user, for any diminution in value caused.

It should be mentioned that the Bill is one of three dealing with similar matters. Two have been presented by the Liberal party, and although similar in some respects do not entirely agree with the Government proposals (No. 2 Bill). The fate of the Liberal Bills is doubtless assured in view of the Government Bill, but the existence of these opposition proposals makes it evident that by no means are all minds agreed on this rather involved question, and much dissension is bound to arise.

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### Electric Vehicles in New Zealand.

The annual report of the Christchurch (New Zealand) Corporation states that the electric-vehicle depôt offers charging and garaging facilities for all sizes of electric vehicles, from runabout cars to 5-ton lorries. Rates are quoted covering charging, watering, and general care of the batteries, and, in addition, the garage staff is able to carry out any repairs required to the vehicles. The number of vehicles at present in the garage is 43. The flat nature of the city and surrounding districts promises well for the future development of the electric vehicle in Christchurch.

# Reducing Selling Costs.

**Some examples of modern practice in the pursuit of economy and efficiency.**

By A. J. SMITH.

THE travelling representative or salesman at one time was regarded in many trades as something between an unavoidable expense (like the rates) and a highly speculative investment which might possibly pay handsomely. The task of selection was frankly admitted to be in the nature of a gamble, in spite of the most careful precautions and preliminary investigations. From all accounts, however, salesmanship is now becoming something in the nature of an exact science, whose principles and practice can be taught, whose exponents work upon lines hardly capable of failure; and it is claimed that the gambling element is consequently entirely removed from this necessary branch of modern industry. Though the writer is not prepared to vouch for the accuracy of the contention, it will be fairly evident from the most casual perusal of the "Situations Vacant" columns during the past few years that a vast change has taken place in manufacturing opinion of what may reasonably be expected of a salesman and what he may expect in return.

Years ago, remuneration of this section of the staff was very usually upon an outright salary basis. It was perhaps a feature of the system that the weeding-out process had to be both drastic and continuous, but not the least of its merits was that it enabled outside staff to be controlled and directed by headquarters exactly the same as the rest of the establishment.

The increasing efficiency of salesmanship, and a growing appreciation of what the trained man could perform, however, brought a modification in the shape of a general change-over to a part-salary part-commission basis, by which the salesman drew merely a nominal fixed salary, depending upon his unaided efforts for the commission necessary to make the post a remunerative one. While increasing the stimulus to exertion, the system lessened to a certain extent the power of direction and control from headquarters.

The next step in increased selling efficiency is very well indicated by the following class of advertisement:—

> "Representative wanted, possessing powerful personality, to market high-grade product made by nationally-known manufacturers. None need apply but thoroughly experienced men who will not be satisfied with less than £2,000 per annum minimum."

It might be explained for the benefit of readers possessing the powerful personality and the wide experience that this is not quite what it seems. Even a sworn affidavit from an applicant that he will on no account accept one penny less than two thousand pounds per annum will hardly help him; nor, if the truth must be told, is the successful applicant at all likely to take home a cheque for £166 at the end of his first month's service. Put into plain English, this class of advertisement is usually a plea from a small manufacturer who on account of a banker's reluctance to increase the overdraft without tangible security is unable to add to his staff on the usual basis, and has perforce to look for a man who will be content to rely for his prospect of remuneration upon a small commission upon sales; "such commission," to quote the legal phraseology of the agreement, "not to become payable until the manufacturer shall have received payment in full." What basis there is for the amount named to be £2,000 per annum is in such cases difficult to discover, for it certainly does not represent the average earnings of half a dozen typical salesmen taken over the last three years according to Income Tax Returns (Schedule "D"), but is a purely imaginary figure which for all the evidence there is behind it might equally well have been stated as £20,000 or £200,000.

Another method of keeping down selling costs which has become increasingly popular of late years is the simple plan of allowing the salesman to pay his own salary out of his own pocket! This is euphemistically described as giving a worker "a stake in the business" or "a share in industry," and is usually presented in the following manner:—

> "District Sales Managers wanted to develop sales of speciality without competition. Salary £500 per annum; investment required, £600."

This plan, to judge by appearances, is a far surer method of raising additional much-needed capital than any financial appeal to the investing public through the usual channels. The drawback from the manufacturing point of view is that it is usually confined to comparatively small sums; £600 is a very common figure, though larger sums up to about £2,000 are occasionally raised in the same way. Regarded from another point of view, the plan has the merit that in addition to obtaining the greatly-desired "stake in the business," the successful candidate can usually obtain a nominal "security of tenure," for a simple calculation will show that even under a definite service contract for a full year the proposition is still a profitable one for the advertiser, who remains £100 to the good at the end of that period, assuming the transaction takes no untoward turn before that time. A study of a few dozen such transactions, however, leads to the conclusion that the remuneration will cease for some reason or another at the end of the second month!

For those who may wish to study the possibilities of this method of making (and losing) money, it might be useful to add that it is not the best or the most business-like application which is most likely to receive attention.

The very latest examples of all make no pretence that remuneration depends upon anything but the unaided work, the financial resources, and the organising abilities of the salesman himself. In this respect, some of the more up-to-date advertisers appear to have profited from a careful perusal of recent reports upon industrial conditions in the United States, where the worker is considered to be entitled to all he can earn. In fact, there are signs that in the Midland manufacturing districts of this country even American selling methods can be improved upon, and the following recent advertisement is quoted to show how a profitable new department may be added to an existing business, or an entirely new undertaking started without financial risk to the owner:—

> "High-class and thoroughly experienced Sales Organiser for new concern selling both to trade and public. Must be prepared to finance his own department, pay his own staff, and make business show a profit. Capital required, £ . . ."

It will be evident from this that our Midland industrialists have nothing to learn from America in selling methods, though one is left with a feeling of slight bewilderment why a modern salesman who is expected to possess the power to launch, sell, and make a profit upon a new product as well as the capital necessary for financing the undertaking should not also be assumed to possess sufficient business acumen to start the new business himself, and take over the profits as well as the risks of the venture.

# Wireless Telegraph Communication.

**A review of the present position of maritime safety services, commercial communication, and point-to-point telegraphy in view of the proposed modified requirements and regulations to be discussed at the forthcoming International Conference in the United States next Autumn.**

By Lieut.-Col. CHETWODE CRAWLEY, M.I.E.E.

(*Continued from page* 594).

### (II) Ships' Commercial Services.

THE International Radiotelegraph Convention of 1912 laid down regulations for dealing with ships' commercial services, as well as with the safety services which we have already considered. Safety and commercial services have developed extensively since 1912, the former because all but the smallest ships are now fitted with wireless telegraph plant, and the latter because, in addition, all the larger ships are now capable of working on continuous waves over great distances.

*Spark Waves.*—By the 1912 Convention all ships fitted had to be able to signal for commercial purposes on the 600-metre and the 300-metre spark waves, the former being used also for distress communications. In addition, an 1,800-metre wave was detailed for long-range working, but this wave has never been used to any great extent. It was intended that a good deal of traffic should be conducted on the 300-metre wave, but, except in the case of small ships, where owing to the smallness of the aerials available the 300-metre wave is suitable technically, it has never been used to any appreciable extent as with larger ships' aerials it is not so good for range; and besides, all ships and coast stations normally stand by on the 600-metre wave for distress purposes. As the 300-metre wave is now within the broadcasting band of all countries, it has been nearly universally abandoned as a ships' wave, and so far as this country is concerned a 220-metre wave is used instead for communicating with small ships, such as fishing vessels, &c., but compared with the rest of ships' traffic the work done on this 220-metre wave is negligible. In this country we are using an 800-metre spark wave to reduce the congestion on the 600-metre wave, but the 800-metre traffic, so far, is small. In other countries use is also being made of waves between 600 and 800 metres, but such waves tend to interfere with both the 600-metre and the 800-metre waves. Waves above 800 metres interfere with waves used for aircraft communication, and waves between 600 and 250 metres interfere with the broadcast services. The allocation of spark waves for ships' traffic, in addition to the 600-metre wave, will be an important question for consideration at the International Conference. In this country the 800-metre wave as an alternative to the 600-metre one is available at the stations at Lands End, North Foreland, Fishguard, Wick and Seaforth, and the 220-metre wave is available at the Humber station and will be employed at other stations in due course.

It is generally recognised that the real solution to the congestion on the 600-metre wave is to transfer the bulk of ships' traffic to continuous waves so as to leave the 600-metre wave free for safety signalling and, possibly, messages on the service of ships. This is a solution which will no doubt be brought about somewhat gradually owing to the expense of fitting continuous-wave sets in ships already fitted with spark sets, and the first step is likely to be the gradual supersession of spark sets by interrupted-continuous-wave sets which will pave the way for the use of continuous waves for traffic purposes.

About 65 per cent. of the traffic between ships and the shore in this country is conducted with the Post Office coast stations on spark waves, the remaining 35 per cent. being conducted on continuous waves with the Post Office station at Devizes. A very small amount of spark traffic is also conducted by the railway companies between their cross-Channel boats and their stations at Parkeston Quay, Heysham, Newhaven, and Folkestone Harbour, the two former using an 800-metre wave and the two latter a 700-metre wave.

*Continuous Waves.*—At present about 320 British ships, or 10 per cent. of those compulsorily fitted with wireless telegraphy, carry continuous-wave installations, and communicate with Devizes up to a range of about 1,500 miles. In addition, 50 per cent. of the British ships compulsorily equipped can receive continuous-wave signals, though they are not fitted with continuous-wave transmitters, and the number of these ships is rapidly increasing. These two classes of ships can receive messages from the Post Office station at Rugby, which broadcasts news and sends ordinary traffic to ships all over the world at scheduled times on an 18,740-metre wave.

The Devizes station transmits on 2,100 and 2,400-metre waves, and receives on 2,100, 2,300, and 2,600-metre waves. Devizes is operated from a station at Burnham-on-Sea, where the reception is carried out, and from which there is direct land-line connection with the General Post Office in London.

Trials have been carried out with high-speed signalling apparatus, but very few ships are fitted for high-speed operation, and, so far, hand working only is carried out here, though on the other side of the Atlantic the few ships which are fitted sometimes resort to high-speed operation when clearing large batches of telegrams.

The Burnham station is fitted with directional receiving aerials in order to reduce interference, and similar arrangements are now being made at such of our spark coast stations as are not already fitted.

Experiments in short continuous-wave communication between ships and the shore are being carried out here and in other countries, but no commercial services are yet in operation. The Devizes station is being fitted with a short-wave set. A new Post Office station to replace Devizes is being erected at Portishead. This station will also be equipped for short-wave, in addition to long-wave, working.

Continuous-wave services were not of course considered in the 1912 Convention, and the wave bands to be allocated to these services will be considered at the forthcoming Conference.

*Charges.*—The normal charge for radio-telegrams to and from Devizes, or to and from any of our 11 spark stations situated round the coast, is 11d. a word, made up of 6d. for the land station, 4d. for the ship, and 1d. for the inland telegraph service. There is also a special rate of 5½d. a word for Press telegrams. The normal

range of Devizes is about 1,500 miles, and that of the spark stations about 250 miles, much greater ranges are frequently obtained. Short-voyage ships, about 450 in number, are given reduced rates of 3½d. or 5½d. a word according to the service on which the ship is engaged. About 3,200 British ships, in addition of course to many foreign ships, make use of all these services for commercial traffic, and this traffic has just about doubled since 1920, when it was laid down that for safety purposes passenger ships and ships of 1,600 tons gross tonnage or over, registered in Great Britain, must be fitted with wireless telegraphy. About two-thirds of this traffic is conducted by the spark stations and one-third by Devizes on continuous waves.

Last year a broadcast service to ships twice daily was opened from the Rugby station at 1s. 6d. a word, including 4d. for the ship charge. This service is available for some 2,000 ships fitted with continuous-wave receivers in any part of the world; the ships cannot of course reply to Rugby direct, but can do so through coast stations abroad, whence the replies can be forwarded to this country by the ordinary telegraph and cable. Rugby also broadcasts Government news messages free of charge three times a day to ships and stations all over the world. Messages can also be sent by the ordinary telegraph route to coast stations abroad and thence by wireless to ships. Radiotelegrams for ships in plain language, code or cipher can be handed in at any postal telegraph office in the country.

The station must be specified in the address of telegrams for Rugby or for stations abroad or for short-voyage ships at the reduced rates. In other cases where the sender is not sure of the station the word "wireless" may be used on the message form in place of the station's name, and the appropriate station will then be selected by the Post Office.

It was laid down in the 1912 Convention that as a general rule a ship should call up the nearest coast station and indicate its position and the next port of call so as to facilitate the disposal of traffic. This however is not always done, so that our coast stations invariably endeavour to get into touch at once with any ships for which they have traffic. The 1912 Convention provides for the retention of a message at a coast station for a period of eight days, or advice of undelivery earlier if it is known that the ship has passed out of the station's radius of action. In practice it is very seldom necessary to retain a message for such a lengthy period, as the object aimed at is early disposal or alternatively early advice of non-delivery.

*Operators.*—The qualifications required by ships' operators were laid down in the 1912 Convention, and the classes of operators to be employed on the different classes of British ships were laid down in the Rules of the Merchant Shipping Act of 1920. Amendments in the qualifications and classification of operators will, no doubt, be discussed at the forthcoming Conference. There are some 4,000 operators on British ships and about 85 per cent. of these are in ships which carry only one operator. The large British passenger ships must carry at least three operators for safety purposes, but more are carried voluntarily in the great liners which deal with a considerable volume of wireless traffic. The position of operators on board British ships up to December last was somewhat anomalous, but has now been brought into line with that of the rest of the ships' officers. The rates of pay of operators with more than three years' service vary from £13 to £20 a month, according to the class and tonnage of the ship on which the operator is serving.

*(To be continued.)*

### Illuminating Engineering Society, U.S.A.

The twenty-first annual convention of the Illuminating Engineering Society is to be held in Chicago from October 11th to 14th, inclusive, with headquarters at the Edgewater Beach Hotel.

# Correspondence.

*Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession.*

### Power Transformer Operation.

In your issue of the 15th inst. there is an article under the above heading dealing with transformer protection. The author, although he rightly recommends the earthing of the neutral on the l.p. side, gives fig. 2 as the correct diagram of connections for M.P. gear on a star-star transformer. The arrangement shown in that diagram will not balance on "straight-through" earth faults; as the current in such cases returns by the neutral on the l.p. side and by the other phases on the h.p. side (the neutral being insulated), it is obvious that balance cannot be obtained with star-star connected current transformers. The secondaries of the latter should, of course, be connected in delta; in fact, the standard rule for all M.P. circulating-current transformer protection is to have star-connected secondaries with delta transformer windings and *vice versa*.

Manchester, *April 20th*, 1927. **G. L. Porter.**

### Cheap Electricity.

I duly noted your review of Messrs. Ruston & Hornsby's pamphlet entitled "Cheapest Electricity—How to obtain it," on page 605 of your issue of April 15th. This is, of course, a condensed version of a pamphlet by Mr. W. C. Mountain entitled "A Word in Favour of the Independent Power Plant." Mr. Mountain specialises in advising on small power plants—and hence is not quite as disinterested as the publishers would apparently wish one to think. When the original booklet first appeared, a marked copy was sent to me by one of the leading engineers of the country, who was highly amused at its speciousness. I have a high respect for the author and his honest belief in his own views, which are shared by others, as is indicated by several papers that have been read lately before various institutions and associations.

The object of this letter is not to attack any of these gentlemen, but rather to draw attention to the great difficulty there is in refuting the arguments put forward in favour of the small independent plant. I agree that there are bound to be special cases where the conditions are such that the small independent plant has advantages over the central undertaking, but they are very few. I may say that I have been an advocate for some years of plants of this nature, for use by power companies, as a temporary measure for the purpose of building up loads, until such a time as it is worth running a distribution line to a new district. Mr. C. Bell Walker has refined this idea, and full-automatic heavy-oil engines, three-phase, storage-battery plants operating at 50 cycles, 400/230 volts (*i.e.*, the same kind of current as the future central-station supply) are now available for the purpose. As a matter of fact, the advocates of small plants could make their case even better, if they made them automatic, as then much of the very costly attendance would be eliminated.

In this particular pamphlet (and also in the various papers that have appeared on the same subject) it will be noted that in no case are *all* the costs included. In other words, the acid test is that current could not be profitably supplied to another independent party at anything like the figures quoted. After all, taxes, rates, rent, repairs, and other out-of-pocket expenses have to be paid by someone. Then there is the question of the stand-by required to ensure uninterrupted service. The manufacturing business that only looks for 5 per cent. on its capital outlay cannot be considered to be in a healthy state. As a matter of fact, nearly every such business can make a far better return by investing all its available capital in its own line. The power cost is almost always but a trivial proportion of the whole of the manufacturing expenditure. Again, in busy times, there is a shortage of power. In slack times the overhead charges of the small power plant mount up excessively per unit generated. It is no use the factory owner persuading himself that his home-generated power is cheap, if a number of what should be generating charges are borne by the works generally. It is natural perhaps that the factory engineer should prefer to have his own generating plant. It is an added technical interest which he thinks also adds to his prestige (incidentally, it increases his worries). Truly, however, the time he expends on this plant could be far better employed in improving factory operations. The adoption of modern quick-costing systems in factories would do much to convince the owner on the point as to the best source of power. It is strange that the independent plant is getting a better run for its money in Great Britain than in almost any other country. Possibly this is largely due to the independent attitude of our race, which seems antagonistic to much co-operative work.

It would do a great deal of good to all branches of the electrical industry if an independent authoritative body such as the Electricity Commissioners could make arrangements to state what are fair rates for charging for current under various conditions in various localities, and so remove much distrust on the part of the user. The latter rarely appreciates that a public utility undertaking, from the very nature of its

business and the publicity to which it is exposed, can never make an extravagant profit. Hence, why should the factory owner extend into another business which cannot be described as lucrative?

I meet many electrical engineers who say that they consider the oil engine good enough for the farmer, and do not see the necessity or advisability of recommending electric motors for his purposes. Still, they would not invest much of their own capital in a company whose object it was to replace the electric motors of the city factory, by oil engines dotted all over the place.

There is much to be said for both sides, yet if factory owners put in their own generating plants, it is very advisable that they should generate the same form of current as the local electricity supply undertaking—as it facilitates getting extra power and, one day, that eventual change-over.

**R. Borlase Matthews.**

East Grinstead, *April 16th*, 1927.

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### Electric Water Heating.

Mr. Ross's article in your issue of April 22nd appears to bear out the contentions in my own contribution in that issue. Assuming that his curve is a good approximation, it is clear that there are three periods of peak, namely, from 7 to 9 in the morning, from 11 to 1 midday, and from 5 to 7 in the evening. If the water heater were automatically switched off at all these times it would not affect the maximum load; and with proper thermal storage it would not seriously affect the hot-water supply. Furthermore, if Mr. Ross's 2 kW were increased a little, so as to give a higher temperature in the tank (or, alternatively, if larger tanks were used) a geyser would surely be unnecessary.

**J. W. Meares.**

Guildford, *April 23rd*, 1927.

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I am very interested in the subject of electric water heating, and was therefore glad to see the article by Mr. J. W. Meares in your current issue, although there are several things in it with which I must disagree.

For one thing, he rather underestimates the cost of a time switch, but as he has over-estimated the annual charge for a *good* time switch, the net result is about correct.

I know it is not unusual for the kick about first cost to be given to the time switch, but I cannot see why this should be. The water heater itself is very much more expensive, and these things really cannot be judged by size or we should expect to pay more for a dustbin than for a decent watch. The fact is that the annual charge for the time switch is less than that of any of the other items, and therefore it is the latter which offer the most scope for reductions.

If Mr. Meares's idea of using a meter element were carried out, I do not know that he would find it much cheaper by the time the necessary gearing and switch had been fitted to it, but the point that he overlooks, and I am afraid you also have overlooked in your footnote, is that any temporary stoppage of supply would put the motor out of operation and subsequently cause the switching on and off to be done at the wrong time; this quite bars that type of mechanism where work has to be performed at stated periods.

With the Warren clock, provided the supply station has installed the proper apparatus, it is possible to get correct average time over the 24 hours, but I can see no prospect of this under Mr. Meares's scheme, as the voltage and periodicity certainly do not average out in the course of a day.

I can answer his question as to whether this has been tried out; I know definitely of its having been tried in New York, and I seem to remember its having been tried out in England, but I cannot say where.

We must bear in mind that even a 1 per cent. error means practically 15 minutes in the course of a day.

I think before very long schemes will be started which will meet Mr. Meares's desires and in which the cost of a time switch will not be too serious.

I should like to ask Mr. Meares if he has not allowed for quite twice as much hot water as a small house would require.

**Ernest E. Sharp.**

London, *April 25th*, 1927.

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### The Salaries of Engineers.

Referring to your interesting article, "The Ordinary Engineer and his Remuneration," by P.B.E., his reference to the Society of Technical Engineers is not quite correct when he states that the declared object of the Society was to raise the status of the engineer. I distinctly remember the chairman of the first Executive Committee at a public meeting in Manchester saying that we must secure "our shares in the wealth of the industry to which we belong and which we have helped to build up." I feel sure this object enrolled more members than any other, and greater progress might have been made with the Society if the chairman had added: "And with our share in wealth we will undertake our share of the burden of responsibility of control, but we must have a voice in determining that responsibility."

My experience when enrolling members was that the average engineer was more interested in his salary than in his status.

*April 23rd*, 1927. **S. W. G.**

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### Electroculture.

We would be very much interested to hear if any of your readers have had experience in the culture of tomatoes by means of electricity. If there are any books available on this subject we would be glad to know where these can be obtained.

**Paisley.**

*April 14th*, 1927.

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# Business and Industrial Notes.

**The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations and Failures.**

### British Industrialists to Visit America.

At the invitation of the Virginia State Chamber of Commerce a party of delegates representing the Federation of British Industries, Chambers of Commerce, and the Chamber of Shipping are sailing to-morrow (Saturday) for the United States. The principal object of the visit is the strengthening of direct trade relations between this country and the Middle-Western States.

### Improvement in the Engineering Industry.

At the London conference of the Amalgamated Engineering Union held a few days ago, Mr. J. T. Brownlie, president, commented on the satisfactory reports on the condition of the industry which had been received. Orders of considerable aggregate value had been obtained, and the records of the Union showed a recent decrease in unemployment, the percentage falling from 12.8 in December last to 8.06 at the end of March. It is generally expected that the employers will make an offer representing an improvement upon the 2s. 6d. bonus, with modifications in the overtime and night-shift conditions.

### G.E.C. Lighting in South Africa.

Several installations of G.E.C. lighting fittings and "Osram" lamps have recently been completed in South Africa. One of the principal instances is the new town hall at Boksburg. In Johannesburg the new Chamber of Mines building has been equipped with these fittings, and the new Prince's Cinema, Durban, has been similarly provided, almost exclusively, with G.E.C. equipment.

### New Belgian Companies.

Under the auspices of the Société de l'Union Minière, a company is being formed in Brussels, with a capital of 60 million fr. and the title La Société des Produits Chimiques au Katanga, to establish works in the Belgian Congo for the electrolytic treatment of copper and the production of sulphuric acid.

La Société Belge-Polonaise de Force et de Traction Electriques is the name of a company which has been formed in Brussels with a capital of 26 million fr., to organise and finance electric power and traction undertakings in Poland.

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### New French Company.

A new company has been formed at Dax with a capital of 250,000 fr. and the title La Société d'Electricité des Landes, to establish electricity distribution undertakings in the Pyrenees.

### Meter Approved.

The Electricity Commissioners have approved of the construction and pattern of the meter known as the Hookham 1907 type, d.c., 2-wire Ah meter, rated from and including 2.5 amps. to 150 amps.

### The Anglo-Spanish Commercial Convention.

The *Board of Trade Journal* announces that a supplementary convention revising certain provisions of the Anglo-Spanish Commercial Treaty of 1922 came into force at midnight, April 23rd-24th. This applies reciprocal most-favoured-nation treatment to certain classes of goods which are scheduled. Special allowance is made for British coal, and among other things the 20 per cent. increase in the Spanish tariff imposed in July last year is removed in respect of some goods and reduced as regards others.

### Unemployment.

The Employment Exchange returns dated April 11th gave the number of registered unemployed as 1,078,300. This represented an increase of 4,540 during the week, and was 53,910 more than on April 12th, 1926.

### Harcourt Lighting Fittings.

We have received from METRO-VICK SUPPLIES, LTD., a series of photographs illustrating examples of installations employing "Harcourt" lighting fittings. They show that these types of fittings are suitable for all kinds of commercial applications

**Harcourt Fittings at Barker's.**

such as banks, offices, and stores. The one reproduced herewith is a view inside Messrs. John Barker's new building, in which a vast array of small articles is excellently illuminated.

### Electric Power in Industry.

The eighth of the preliminary reports upon the 1924 Census of Industry was published as a supplement to the *Board of Trade Journal* dated April 21st; it deals with the paper-making, printing and allied trades. In the paper-making industry the amount of generating plant installed rose from 14,914 kW in 1907 to 32,075 kW in 1912, and 79,032 kW in 1924. The aggregate capacity of electric motors installed was 146,715 h.p. in 1924, as compared with 38,130 h.p. in 1912; power for 38,341 h.p. of the motors was purchased in 1924. The printing and bookbinding trades reported 6,593 kW of electrical generating plant, as against 7,645 kW in 1907. The installed motor-power aggregated 81,514 h.p., power for 70,593 h.p. of which was purchased. In the trades covering the printing and publication of newspapers and periodicals 3,911 kW of generating plant was in use in 1924, as against 2,220 kW in 1907. Electric motors with a total capacity of 56,337 h.p. were installed, power for 55,724 h.p. of which was purchased.

### Czecho-Slovakian Tariff Reductions.

Under the recently-signed Commercial Treaty between Czecho-Slovakia and France, which comes into force 15 days after ratification, the duties upon several classes of goods upon importation into Czecho-Slovakia are reduced. As Great Britain is on a "most-favoured-nation" basis with Czecho-Slovakia, the reductions apply equally to goods from this country. The classes affected include steam turbines, electric generators, motors, telephone and telegraph apparatus, electrical measuring apparatus, ignition apparatus, and other, unspecified, electrical goods (except mounted carbon brushes, cooking and heating apparatus, and dry batteries). A full list of the classes involved, with the reduced rates of duty, appears in the *Board of Trade Journal* dated April 21st.

### Local Exhibitions.

HAMMERSMITH.—The Electricity Department of the Hammersmith Borough Council has arranged a special electrical display to form part of the exhibition at the Town Hall in connection with the Health Week campaign, which commences on May 8th. The General Electric Co., Ltd., has arranged to erect two stands on which a complete range of "Magnet" household electric appliances will be shown. There are to be frequent demonstrations with such appliances of electric cooking, washing, &c.

CLITHEROE.—The Electricity Committee is arranging an exhibition of electrical apparatus at the Castle, and representatives of neighbouring local authorities have been invited to attend.

MANCHESTER.—At the Better Housing and Housekeeping Exhibition organised by the *Daily Dispatch* at the City Hall, Manchester, an "all-electric" house has been completed adjoining the Main Hall. The electrical installation has been carried out by Messrs. E. O. Walker & Co., Manchester, and the furnishings by Messrs. Waring & Gillow. Vacuum cleaners are exhibited by the C.C.A. (Vacuum Cleaners), Ltd.; the Gem Labour-Saving Device Co., Ltd.; Hoover, Ltd.; Vac-tric, Ltd.; and Thorwash, Ltd. The last company also exhibits electric washers and wringers. Electrolux, Ltd., shows its cleaner and refrigerator, and Frigidaire, Ltd., displays its automatic electric refrigerator. The exhibition will remain open for one month.

MORECAMBE.—An "all-electric" bungalow is a feature of a Spring Trades Exhibition, opened at the Winter Gardens, Morecambe, on April 27th, and which continues until May 4th, under the auspices of the Morecambe Chamber of Trade. Mr. Francis, of the British Electrical Development Association, is giving lectures on the domestic uses of electricity.

### Recent Contracts.

The ENGLISH ELECTRIC CO., LTD., has received an order from the Measham Collieries, Ltd., for an electric winder for the Minorca Pit. The winding motor, which is of the 3-phase induction type, will drive the drums through single-reduction, treble-helical gearing, the motor output being 160/325 b.h.p. at 363 r.p.m. Power is being obtained from the Warwickshire and Leicestershire Power Company at 11,000 V, and a transformer with the necessary h.p. switchgear is being installed. The winder will be designed to deal with an output of 122 tons per hour from a depth of 540 ft., the net weight per lift being 48 cwt. Normally, however, coal will be drawn from the 270 ft. level and, in view of there being two working levels, it has been decided to install a double drum winder, one drum being fixed to the shaft, and the other loose, but fitted with a multi-tooth clutch, so that the rope can be adjusted easily and quickly to permit winding from either level. The mechanical parts are being supplied by Messrs. Fullerton, Hodgart & Barclay, Ltd. In addition to the winder a 250-kW motor-generator set has also been ordered from the English Electric Co., together with the necessary a.c. and d.c. switchgear, to provide an alternative source of d.c. power for the plant at Measham Colliery, which at present is being supplied from the colliery power station.

We learn that within the last few days the ELECTRIC FURNACE CO., LTD., has received orders for six Ajax-Wyatt brass melting furnaces, each of 600-lb. capacity, for a French firm, and also a 100-kW resistance furnace for annealing aluminium sheet in Scotland.

### Chinese Electrical Imports.

*Commerce Reports* states that certain sections of China appear to be much alive to the advantages accruing from the use of electrical power. Not only were electric railroads and electric lighting facilities extended during the first nine months of 1926, but considerable business was transacted in motor-driven machinery for buildings and for grinding cereals. As a result, China's imports of electrical equipment, including general supplies and telegraph, telephone, and power-station materials, advanced 17 per cent., while imports of machinery were reduced about 2.5 per cent. During the period January-September, 1926, electrical materials and equipment to the value of 9,044,502 taels was imported through 45 maritime Customs ports, as compared with 7,731,728 taels in the corresponding period of 1925. The Haikwan tael averaged 3s. 6d. in 1925 and 3s. 2d. in 1926.

### British Goods in South America.

Speaking at the recent annual meeting of the British Bank of South America, Mr. F. R. S. Balfour said that while there existed in South America a distinct preference for British goods, even at higher prices, there were several factors operating to the detriment of British export trade. One of those was the tendency for the trade to develop between a borrowing nation and the centre affording accommodation. That had happened between the United States and South America, in spite of the former country's tariffs, which had acted in her favour. Again, confidence in British manufacturers was being undermined by the continual industrial disturbances in this country; there was uncertainty regarding delivery. Our prices and freight charges were too high, and placed us at a considerable disadvantage in respect of our competitors. Local manufacturers also had to be contended with. If our connection with South America was to be maintained, the needs of the market must be thoroughly studied by reliable representatives, and suitable, effective propaganda must be pursued.

### For Sale.

The County Mental Hospital, Rainhill, Lancashire, has for disposal one 115-kW, 230-V steam-driven, direct-coupled d.c. generating set. Crittall Manufacturing Co., Ltd., has for disposal two Garrett direct-coupled generating sets, condensers and auxiliaries. (See our advertisement pages to-day.)

### Trade Announcements.

The NANTWICH ELECTRICAL CO. has opened premises at 4, Church Lane, Nantwich.

A new company has been formed with the title CANADIAN PORCELAIN CO. (BRITISH), LTD.—its registration is detailed in our "New Companies" column this week—to act as exclusive representative here of the Canadian Porcelain Co., Ltd., of Hamilton, Canada, manufacturers of extra-high-pressure insulators, transmission line equipment, &c. Its office is at 343, Abbey House, Victoria Street, London, S.W.1, and the branch will be in charge of Mr. Geo. M. Duncan, manager of sales for the Canadian Co. and managing director of the new company, and of Mr. Chas. A. Burnier, secretary and sales engineer of the new company.

MESSRS. WEIGHT & BRADLEY, wireless engineers, have opened premises at 14, Cross Street, Reading.

A company known as LECTRO LINX, LTD., has been formed with offices at 1, 2 & 3, Ashley Mansions, Vauxhall Bridge Road, S.W.1, to undertake the exploitation of the "Clix" specialities. Notice of registration appears in our "Financial Section" to-day.

MR. W. E. BEAVER has commenced business as an electrical engineer at 176, Park Road, Peterborough.

The GENERAL RADIO CO., LTD., has purchased Radiobats, Ltd., and has thus secured control of an English high-tension radio battery factory producing 7,500 cells per week.

MESSRS. POYNTER, GRIFFITHS & CO., LTD., of the Maxim Lamp Works, have increased their capital. Sir James W. Paton, J.P., of Paton, Calvert & Co., Ltd., Liverpool, and Mr. John Baird Walker, of the Fine Cotton Spinners' & Doublers' Association, Ltd., have joined the board—which now consists of these gentlemen, Mr. Thos. Crosby (chairman), Mr. T. H. Griffiths and Mr. J. F. Poynter (managing). The registered offices remain at Canonbury Road, N.1.

MR. A. W. SAULTER has granted a sole licence to Messrs. Hugh Stevenson & Co., Ltd., Manchester, for the manufacture of his patent coiling device.

### New Catalogues and Lists.

POWER CONTRACTS, LTD., 138-140, Southwark Street, S.E.1.—An illustrated folder advertising "Batwin" electric motors for many purposes.

THE YORKSHIRE ELECTRIC TRANSFORMER CO., LTD., Dewsbury.—A leaflet illustrating an example of the company's pole-type transformers for rural distribution.

MESSRS. WILLIAM GEIPEL & CO., Vulcan Works, St. Thomas Street, S.E.1.—Two leaflets, describing Ward Leonard "Vitrohm" resistors, for which the company is sole agent for the United Kingdom and the British Colonies, and Ward Leonard theatre-lighting dimmers.

THE GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2.—The "Osram-G.E.C. Bulletin" for April, containing illumination notes, descriptions of "Magnet" domestic appliances, and articles upon "Osram" valves and radio apparatus.

THE HART ACCUMULATOR CO., LTD., Marshgate Lane, Stratford, E.15.—A purse folder containing an attractive pamphlet giving prices and details of "Hart" radio batteries.

THE CHLORIDE ELECTRICAL STORAGE CO., LTD., Clifton Junction, near Manchester.—A photogravure poster (20 in. by 30 in.) illustrating and advertising in a pleasing manner "Exide" high- and low-tension wireless batteries.

SOCIETE DES ETABLISSEMENTS A. FOUCHER, 62, Boulevard Jourdan, Paris, XIVe.—A booklet containing illustrations of machine tools for the book-making and box-making industries.

MESSRS. HOUGHTON-BUTCHER (GREAT BRITAIN), LTD., 88-89, High Holborn, W.C.1.—"Houghton's Radio News" for April, containing illustrated descriptions of radio apparatus and accessories and articles on various phases of the radio business.

The FULLER ACCUMULATOR CO. (1926), LTD., Chadwell Heath, Essex.—A showcard, in colours (18 in. by 12 in.) depicting "Fuller" batteries as "The Power Behind the Valve."

The BRITISH B.A.G., LTD., 23, Farringdon Avenue, E.C.4.—Two illustrated and priced catalogues dealing with lighting, heating, and cooking appliances, &c., and a folder advertising the "Lomax" lampholder.

MESSRS. WATSON & SONS (ELECTRO-MEDICAL), LTD., Sunic House, Parker Street, Kingsway, W.C.2.—Bulletin No. 81, dealing with the new "Sunic" flat Potter-Bucky diaphragm.

THE DRAYTON REGULATOR & INSTRUMENT CO., LTD., West Drayton, Middlesex.—An illustrated leaflet describing the "Drayton" pressure recorder.

RANSOME & MARLES BEARING CO., LTD., Newark-on-Trent.—A comprehensive catalogue of the company's roller and ball bearings for all purposes. The list is illustrated and priced, and provided with a thumb index to the various sections.

THE ATLAS DIESEL CO., LTD., 35, Surrey Street, Strand, London, W.C.2.—A well-illustrated booklet describing the company's air compressors and pneumatic tools.

MESSRS. A. F. BULGIN & CO., 9-11, Cursitor Street, Chancery Lane, E.C.4.—List 111, illustrating various "Competa" radio products; list 112, "Competa" measuring instruments; lists 114 and 115, "Deckorem" radio products; and list T.2, illustrating "Taka" radio terminals. The whole are contained in a convenient folder carrying the company's name and address, &c.

The WALKER ELECTRICAL SERVICE, Annandale Street, Edinburgh.—A folding card advertising the firm's repairing and overhauling business.

HIGGS MOTORS, Witton, Birmingham.—A comprehensive catalogue of the firm's industrial a.c. and d.c. motors, containing full specifications, details and prices, as well as particulars of control gear.

The MARCONIPHONE CO., LTD., 210-212, Tottenham Court Road, W.1.—A coloured poster (38 in. by 29 in.) setting out in minute detail the arrangement and wiring of the K-1 three-valve receiving set operating direct from a.c. mains.

MESSRS. S. DAVIS & CO., Aldwych House, Aldwych, W.C.2.—A brochure illustrating many examples of the firm's publicity work in widely-differing fields.

### Bankruptcy Proceedings.

T. F. COLLIER, Union Street West, Oldham, electrician.—The public examination of this debtor was held recently at the Court House, Oldham. The statement of affairs showed liabilities of £77, and there were no assets. Debtor stated that in February, 1919, he commenced business as an electrical engineer at Olive Street, Werneth, with £500 left by his father. He was successful at first, but later there was a decline in trade owing to general depression. In August, 1922, he sold the business to a limited company for 430 £1 fully-paid shares. These debtor later sold to his mother for 10s. a share in consideration of a loan of £500 received in 1921. In July, 1926, debtor started as an electrical engineer again, but owing to lack of capital was not successful, and in January last his trade effects were realised under an execution. The examination was adjourned.

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W. J. BROOME (Stockport Electrical Co.), electrical engineer, Garrick Place, Daw Bank, Stockport.—First meeting to be held to-day (Friday), at the Official Receiver's offices, Manchester; public examination, May 3rd, at the Court House, Stockport.

H. BUSFIELD and J. J. WHITTAKER (Busfield & Co.), electrical engineers, 6, Wilfield Street, and 215, Padiham Road, Burnley.—Trustee, Mr. H. Parker, Official Receiver, 11, Winckley Square, Preston, released April 6th.

### Company Liquidations.

SERVICE RADIO CO., LTD., 67, Church Street, Stoke Newington, N.16.—A meeting of creditors was held on April 19th at the Institute of Chartered Accountants, E.C., when the chair was occupied by the liquidator, Mr. I. Levy, 27, Chancery Lane, W.C. The statement of affairs presented disclosed liabilities of £1,409, of which £1,320 was due to the trade, and assets of £308, leaving a deficiency of £1,101. The liquidator reported that the company was registered on February 15th, 1924, with a nominal capital of £1,000, to carry on the business of manufacturers of wireless components and parts. The subscribed capital was £150, fifty £1 shares being held by Mr. W. Grossman and 100 £1 shares by Mrs. L. Grossman, his sister-in-law. The management of the business had been under the control of Mr. Grossman. For the 17 months to July 31st, 1925, there was a net profit of £89. The turnover for that period was £14,645, on which there was a gross profit of approximately 20 per cent. For the 12 months to July 31st, 1926, there was a turnover of £4,331 and a loss of £74. In that period £1,012 was spent on advertising. Accounts for the eight months to March 31st, 1927, showed a turnover of £2,532 and a loss of £529. Endeavours had been made to obtain fresh capital without success; creditors began to press, and it was decided to go into voluntary liquidation. One creditor had levied execution, and over £100 worth of stock had been sold to satisfy the claim. A resolution was passed providing that application should be made to the Court for the appointment of Mr. W. A. J. Osborne, of Messrs. Corfield & Cripwell, Balfour House, Finsbury Pavement, E.C., as liquidator in the place of Mr. Levy. The following are creditors:—

| | £ | | £ |
|---|---|---|---|
| Albion Mfg. Co. ... | 69 | Igranic Electric Co., Ltd. | 43 |
| Birkbys, Ltd. ... ... | 27 | Jewel Pen Co. ... ... | 75 |
| Benjamin Electric, Ltd. | 79 | Odham's Press ... ... | 47 |
| Clackson, A. H., Ltd. ... | 186 | Petruskin, — ... ... | 49 |
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SHERBORNE TRUST, LTD., 65, London Wall, E.C.—Under the compulsory liquidation of this company Mr. G. Digby Penya, Official Receiver and Liquidator, reports that it was formed in June, 1926, with a nominal capital of £2,500, and entered

into various underwriting contracts for shares and debentures, some of which it was unable to fulfil. The promoters were Messrs. Frederick Seyffert and J. A. H. Chaproniere. In respect of one sub-underwriting contract for £100,000 debenture stock of the Perak River Hydro-Electric Co., Ltd., the company had to take up and was allotted £7,800 of the stock. A cheque for the application money of £500 is stated to have been given by Mr. Chaproniere, but was dishonoured, and the amount had to be paid by the underwriters. The company received £250 and 500 ordinary shares of £1 each in the Perak River Hydro-Electric Co., Ltd., as commission. The underwriters obtained judgment against the company for the £500 paid by them, and obtained a charging order absolute on the debenture stock and the 500 ordinary shares. The company was unable to carry out its contract. The allotment was cancelled and the £500 paid by the underwriters forfeited. The accounts filed under the liquidation show liabilities £2,249, against assets £7; whilst the only issued capital of the company are two signatories' shares, which do not appear to have been paid for.

### Deed of Arrangement.

MRS. NINA RAYNER, trading as D. D. Rayner & Co., electrical engineers, 26a, Curzon Street, Derby.—The trustee, Mr. J. M. Sibbald, 21, Corn Market Derby, reports that the winding-up of the business has been delayed by a disputed account. A statement shows a balance of £95, and it is said that as soon as the account mentioned is settled, the surety will be called upon for the balance due in order to make up the composition of 6s. 8d. in the £.

### Dissolution of Partnership.

FALGATE ELECTRICAL CO., 9, Merchants' Place, Reading.—Messrs. A. E. Falgate and A. S. Sayer have dissolved partnership. Mr. Sayer will continue the business at the old address. Mr. Falgate will carry on business at 21a, King's Road.

### Employment During March.

The April *Ministry of Labour Gazette* states that while employment in a number of important industries remained bad during March, there was, nevertheless, a pronounced improvement in industry generally. There was a further, almost general, improvement in the engineering industry, and the overall percentage of unemployed fell from 11.6 in February to 10.3 in March. The unemployment percentage of the electrical engineering branch fell from 6.5 to 6.2. In the electric cable, wire and lamp manufacturing group the proportion of unemployed remained at 8.6 per cent, but there was a fall in the case of the electrical wiring and contracting industry from 8.9 to 7.9 per cent. The actual numbers of unemployed at March 21st were as follows:—Total, 1,187,782; engineering (including electrical), 103,262; electrical engineering, 4,790; electrical wiring and contracting, 1,093; and cable, wire and lamp manufacturing, 7,567.

### Irish Free State Wireless Duty.

In the course of his recent Budget statement in Dail Eireann, Mr. E. Blythe, Minister for Finance, said that the import duty on wireless apparatus was calculated to produce £20,000 during the financial year 1926-27, and the actual yield had been just over £19,000 in that period. The policy of the Government was to expend on additional stations and provide better programmes, all the revenue got out of broadcasting, whether in the way of Customs duties, licence fees, or fines recovered from defaulters.

### Scientific Production.

The *Financial Times* quotes the following statement by Mr. J. C. Goff at last week's annual meeting of Crosse & Blackwell, Ltd., upon the subject of the installation of up-to-date efficient plant:—"We now work 47 hours per week. On the same turnover, with the introduction of modern machinery and scientific methods, we are getting more goods made, we are paying better wages, we are getting shorter hours, and we are earning bigger profits."

### Australian Wireless Litigation.

The Melbourne *Age* reports that recently the action of the Amalgamated Wireless (Australasia), Ltd., Sydney, and the Associated Radio Co., of Australia, Ltd., Melbourne, was before the Chief Justice in the Practice Court on an application for a stay of proceedings in the action pending appeal to the State Full Court. The action relates to an agreement under which the Amalgamated Wireless granted a licence to the Associated Co. to use certain patents, in return for which the latter company agreed to pay 25 per cent. of its revenue as a broadcasting authority, with a minimum of 10s. per subscriber. At the date of the agreement the regulations provided for the broadcasting company to charge a fee to all listeners-in, but later this arrangement was replaced by a State licensing system whereby part of the receipts were paid to the company by the Government. The defendant company thereupon contended that the agreement terminated as the basis was destroyed, but Mr. Justice McFarlan gave judgment for the plaintiff company for £5,502. Counsel for the latter offered to repay the money within 48 hours if Mr. Justice McFarlan's decision was set aside. This undertaking was accepted, and the application was dismissed.

### Book Notices.

"Principes de L'Electro-Chimie," by J. Ponsinet. Pp. 211. Paris: Armand Colin. Price 9 fr.

"Electrical Horology," by H. R. Langman and A. Ball. Pp. xi+170; figs. 68. London: Crosby, Lockwood & Son. Price 7s. 6d. net.

"The *Electrician* Annual Tables of Electricity Undertakings for 1927." London: Ernest Benn, Ltd. Price 10s. net.

"*Journal* of the American Institute of Electrical Engineers." Vol. XLVI, No. 4. April, 1927. New York: The Institute. Price $1.

"*Journal* of the Institution of Electrical Engineers." Vol. LXV. April, 1927. No. 364. London: E. & F. N. Spon, Ltd. Price 10s. 6d.

Scientific Papers of the U.S.A. Bureau of Standards. Vol. 21, No. 546, "Magnetic Reluctivity Relationship." (5 cents.)

"Carbon Brushes and Brush Shunts. Simplified Practice Recommendation." No. 56. Issued by the U.S.A. Bureau of Standards. (5 cents.)

### American Exports to New Zealand.

In a recent article upon the New Zealand electrical market, *Commerce Reports* shows that United States electrical goods to the value of $1,404,363 were imported into the Dominion during 1925. The chief item was storage batteries ($171,042), while other notable classes were domestic heating and cooking devices ($130,431), electro-medical apparatus ($98,265), flashlight batteries ($72,420), and switches and circuit breakers over 10 A ($70,391). Our contemporary claims that for sizes up to 5 h.p. American motors predominate.

### The Department of Overseas Trade.

The following resolution was to be moved on behalf of the Executive Council at the annual meeting in London this week of the Association of British Chambers of Commerce:—"The Association of British Chambers of Commerce regards with dismay the proposal of His Majesty's Government to discontinue as a separate department the Department of Overseas Trade. The Association is of opinion that the department has proved itself to be of great value in the assistance which it has rendered to the overseas trade of the country, and that so far from its discontinuance as a separate department being likely to benefit the finances of the country, such a change will tend to retard the extension of our commerce overseas, and the loss to the Treasury will cancel any saving in expenditure. The Association believes, moreover, that only a small part of the expenditure of £328,000 a year will be saved because many of the functions performed by the department are pre-war duties which were previously undertaken by the Board of Trade or the Foreign Office, and must be continued and paid for. The Association therefore urges His Majesty's Government to allow the work of the department in the furtherance of British trade to continue separately on its present lines, and to be extended."

### New Artificial Silk Company.

The position with regard to the contract openings of Scottish Artificial Silks, Ltd., has been somewhat clarified by the registration of the company with a capital of £250,000 and offices at 145, St. Vincent Street, Glasgow. The company is to erect a weaving factory at Kirkcudbright, in the old Galloway motor works, and a yarn-producing plant at Hyde, in the old Providence Mill. Negotiations are almost completed for the purchase of the old Argyll Motor Works at Alexandria, near Dumbarton.

### Prices of Raw Materials.

Messrs. F. Smith & Co. report, April 26th:—Copper (electrolytic) bars, £62 5s., 15s. dec.; ditto ditto sheets, no change; ditto ditto wire rods, £72 5s., 15s. dec.; ditto ditto h.c. wire, 9¼d., ¼d. dec.; Silicium bronze wire, 10¼d., ¼d. dec.

Messrs. James & Shakespeare report, April 26th:—No change in the prices of copper bars (best selected), sheet and rod; English pig lead, £27 5s., 20s. dec.

Messrs. Edward Till & Co. report, April 26th:—No change in the price of India-rubber, Para fine.

Messrs. C. Clifford & Son report, April 26th:—Babbitt's metal and anti-friction metal, Grade I, £258, £14 dec.; Grade II, £180, £9 dec.; Grade III, £94, £3 dec.

Messrs. James Forster & Co., in their letter dated April 23rd, state:—"Closing prices yesterday were £26 1s. 3d. for April, and £26 10s. for July. . . . Before the Easter holidays consumers showed some interest, and purchases were made by cable makers and the home trade. This week demand has been very quiet, which is not surprising in view of the fresh fall in prices. . . . The future is obscure, but there are certainly more grounds for optimism than pessimism. The position on the Continent is improving, while in this country, the reduction in the Bank rate is bound to stimulate industry and increase demand. Moreover, the metal is getting to a figure which may result in trouble in the mines, particularly in Australia, and thereby hamper production. The Board of Trade returns for March show imports of 22,504 tons and exports of 1,317 tons, leaving 21,187 tons for home absorption."

# Lighting and Power Notes.

**Bangor.**—LOANS.—The Town Council is applying for sanction to borrow £1,000 for transformers and switchgear, £1,000 for meters, and £6,000 for mains and services.

**Barking.**—LOANS SANCTIONED.—The Electricity Committee has received sanction to the borrowing of £4,000 for buildings, £4,000 for mains, and £3,280 for plant.

**Barnsley.**—CHANGE-OVER.—The borough electrical engineer has submitted a report to the Electricity Committee upon the necessity of a further change-over from d.c. to a.c. in certain areas in order to meet the winter load of 1927, and also the provision of a sub-station and a ring h.p. main between Harboro' Hill Road and Hall Baulk Lane, at a total estimated cost of £5,336. Application is to be made for sanction to a loan for this purpose.

**Birkenhead.**—ELECTRICAL DEVELOPMENT.—That the Corporation electricity showrooms have well justified their expense is demonstrated by statistics which have just become available. During the past year, since the opening of the showroom, the following increases in the use of electrical devices have been registered:—Cooking appliances, 285 per cent.; electric fires, 86 per cent.; other domestic appliances, 75 per cent. The value of apparatus sold by the showrooms was £5,700. During the year ending March 31st last 2,820,000 kWh was sold for domestic consumption, an increase of 112 per cent. The showrooms are to be extended.

**Bridge of Allan.**—ELECTRICITY SUPPLY.—In the event of the Electricity Commissioners sanctioning the transfer of the Town Council's Special Order to the Scottish Midland Electricity Supply, Ltd., the company is prepared to undertake the laying of an underground distribution network in the burgh at an estimated cost of £4,500. Pending the transfer of the Order the company will act as the duly authorised agents of the Council.

**Buckingham.**—ELECTRICITY SUPPLY.—The Town Council and the Rural District Council have consented to an application by the Northampton Electric Light and Power Co., Ltd., to extend its area of electricity supply to include the borough and rural area. Underground mains will be laid in certain streets in the borough, and overhead cables erected in the rural area, and the maximum prices will be 10d. per kWh in the borough and 1s. in the rural district.

**Canada.**—ELECTRICAL DEVELOPMENT.—The Dominion Water Power and Reclamation Service of the Department of the Interior of Canada has recently issued the annual review of the water-power resources of Canada, developed and undeveloped, as at March 1st, 1927, according to the most recent information available. This bulletin includes sections dealing with current progress and development, the use of water-power in the central electricity stations and for the pulp and paper and other leading industries, the coal equivalent of developed water-power, and estimates of the developed and undeveloped water-power in each province. By the end of the year 1926 Canada's hydro-electric installation reached a total of 4,556,266 h.p., of which 265,838 h.p. was installed during that year. While the addition for 1926 was substantial, it falls far short of indicating actual constructional activities, as projects under way, a number of which are nearing completion, will ultimately add to the Dominion's total more than 1,700,000 h.p., while others in active prospect indicate a further addition of 1,000,000 h.p. The capital investment due to these developments under construction and in prospect is estimated at approximately $270,000,000, regardless of the extra capital required in the application of their power output.

**Clayton (Yorks.).**—LOAN.—The Urban District Council is applying for sanction to the borrowing of £7,000 for mains, &c.

SUPERVISING ENGINEER APPOINTED.—Alderman J. W. Longley, deputy chairman of the Bradford Corporation Electricity Committee, was consulting engineer to the Urban District Council during the negotiations which recently resulted in the Council securing an Order to supply electricity in the district, and has now accepted the position of supervising engineer in connection with the laying of cables and services. It is expected that an electricity supply will be available next winter.

**Continental.**—PORTUGAL.—A new company called the Confederação Hidrografica do Douro, a subsidiary of the Espano-Portuguesa de Transportes Electricos, has been formed for the purpose of utilising the waters of the Douro for industrial and irrigation purposes. By the use of turbines the river is expected to yield a total of 800,000 h.p.—*Reuter* (Lisbon).

BELGIUM.—The Société d'Electricité de l'Escaut, Antwerp, in its report for last year, states that the number of consumers increased from 24,147 to 30,800, while the sale of power advanced by 16 per cent. At the Merxem power station three new boilers and two additional 12,500-kW turbo-generator sets were installed and put in operation. A 50,000-V transmission line was also completed to supply power to the northern and eastern portions of the province of Antwerp, and the line is now being extended in order to link up the Merxem power station with one at Moll-Donck which is being erected by the Société d'Electricité de la Campine.

ITALY.—As a result of the difference in the conditions between the water supply for the hydro-electric power stations in the Alps and in the Appennines, it has been found desirable to connect the plants in the two areas by means of h.p. transmission lines so that in times of low output and high demand one can supply the other. A 130,000-V line has recently been erected by the Società Interregionale Cisalpina to connect the plants of the Società Edison in the Southern Alps with the stations of the Società Emiliana d'Esercizi ed Idroelettrica in the Northern Appennines. The line is about 94 miles in length, and extends from a transformer station at Brughiero, near Milan, to Reggio Emilia. The Società Edison has two stations, one at Paderno, with an annual output of 300 million kWh, and the other at Oresca capable of an output of 200 million kWh per year. The Società Emiliana has plants in operation and in course of construction with a capacity of 133,000 kW. The Brughiero transformer station will later be connected to new plants with a total capacity of 275,000 kW, which the Società Cisalpina is erecting on the Livo at Chiavenna and on the Mera near Sondrio.

SWITZERLAND.—Application has recently been made for a concession to establish a plant near Klingnau to utilise the water power of the lower falls on the Beznau-Koblenz, where it is estimated that from 18,000 to 30,000 h.p. is available. The power produced would be "exported" to Wurtemburg, but if the concession is granted a Swiss company is to be formed to exploit it.

**Croydon.**—NEW CABLES.—The Corporation Electricity Committee is to replace cables from Crown Hill and Gloucester Road to the power house, at a cost of £1,900.

**Douglas (I. of M.).**—LOAN.—The Electricity Committee is applying for sanction to the borrowing of £11,000 for mains, services, meters, cookers, &c.

**Farnham.**—ELECTRICITY CHARGES.—The Electricity Charges Committee of the Urban District Council reports that in May last the Council approached the Farnham Gas and Electricity Co. with a request for the voluntary reduction of the present lighting charges from 10d. to 6d. per kWh, and for a reduction in power charges, upon the ground that the company was now purchasing its supply in bulk from the War Department. The consideration of this request has been held in abeyance until the completion of the company's accounts for the year 1926. The Committee has had an interview with representatives of the company, who have intimated that it is not prepared at the present time to make any reduction. The Committee is of opinion that application should be made to the appropriate Government department for an Order reducing the maximum prices, in the hope that the Department will hold an inquiry into the circumstances of the case.

**Grantown-on-Spey.**—ELECTRICITY SUPPLY.—The town has been supplied with electricity since 1912, under an agreement with a local contractor, and the Council has now decided to renew the agreement, which was due to expire this year, as an alternative to purchasing the undertaking. The new agreement is made subject to the contractor installing additional plant and modifying and extending the distribution system to meet the demands of the burgh. Mr. Frank Anslow, M.I.E.E., of Messrs. Walter Dixon & Co., Glasgow, who has been advising the Council in its negotiations with the contractor, has been retained for a period of three years to supervise the installation on its behalf.

**Gravesend.**—LOAN SANCTION.—The Corporation Electricity Committee has received sanction to a loan of £20,000 for mains and services.

**Grimsby.**—LOAN.—The Corporation Electricity Committee is applying for sanction to the borrowing of £20,000 for mains and services.

**Halifax-Huddersfield.**—INTERCONNECTING SCHEME.—Speaking at Halifax Rotary Club, on April 20th, Alderman Thos. Hey, chairman of the Tramways and Electricity Committee, stated that the linking between the Halifax and Huddersfield Corporation electricity undertakings was now complete and had already been working. From midnight on the Saturday preceding Easter to the morning of Wednesday following Easter the Halifax station had been supplying the whole of Huddersfield, as well as Halifax, whilst much-needed repairs were undertaken at Huddersfield station. The repairs at Huddersfield not being yet completed, the Halifax station was still supplying Huddersfield with 2,000 kW to complete the Huddersfield load.

**Harrogate.**—ELECTRICITY AGREEMENTS.—The Council has ratified agreements for the purchase of the Knaresborough electricity undertaking and a bulk supply of electricity to Ripon.

**Hastings.**—ELECTRICITY EXTENSIONS.—The Town Council is commencing forthwith the laying of mains and the erection of overhead cables for a supply of electricity to Rye, Battle, and to places in the rural districts of Hastings, Rye, Battle, and Hailsham. The estimated cost of the work is over £70,000, and the proposed charges are 8d. per kWh for lighting and 1½d. per kWh for power.

**Hull.**—ELECTRICITY IN BULK.—Provided sanction is obtained from the Electricity Commissioners, the Corporation will supply electricity in bulk to Driffield. According to the *Manchester Guardian*, in a letter from the Driffield Urban

Council it was suggested that future extensions of the electricity undertaking might link up outlying districts between Hull and Bridlington so that intervening local authorities might take supplies in bulk for local consumption. The Corporation has already decided to seek sanction for an extension of its supply to Beverley at the request of the latter town.

**London.**—Islington.—The Electricity Committee is applying for sanction to the following loans:—Meters, £8,000; transformers, £20,000; mains, £27,000; services, £17,000. The Committee proposes to proceed with the erection of cooling towers at the power station at a cost of £33,000.

**Milton (Hants.).**—Electricity Supply.—At a recent meeting of the Urban District Council it was reported that a meeting with the representative of the Milton and Barton-on-Sea Electricity Supply Co. had been held, who pointed out that if underground cables were laid the cost of electricity would be 2d. per kWh more than if overhead cables were erected. It was suggested that there should be no overhead lines from the railway station to the corner of Barton Court Road and Avenue and the Marine Drives. After some discussion it was decided to approve the suggestion, and the overhead system of wiring, subject to certain safeguards, was agreed to.

**Newport (I. of W.).**—New Cables.—The Town Council has given permission to the Isle of Wight Electric Light and Power Co. for the laying of armoured service cables under the bed of the river Medina, in Hillside Road, and along the railway line from Newport to Cowes. The borough surveyor states that the railway line cable will be placed on concrete posts about 4 feet high.

**Northern Ireland.**—Portadown (Co. Armagh).—The Urban District Council has passed plans for the reconstruction of the local company's power station, which was recently destroyed by fire.

**Palestine.**—The Rutenberg Concession.—According to a correspondent at Jerusalem, the concession granted to the Palestine Electric Corporation (the "Rutenberg" concession) for the electrification of Palestine and the irrigation of the country has now been put into force by an order of the Government of Palestine. With regard to the extension of the scheme to Transjordania, there is still some opposition. Another scheme concerns the utilisation of water power for purposes of electrification in Southern Lebanon. A commission, under the presidency of the Minister of Public Works, has been appointed to examine the question of the use of the power of the Nahrel Awali, the preliminary works being still in an initial stage.

**Price Reductions.**—Reductions in the charges for electricity have been made or recommended in the following districts:—

Whitehaven.—Lighting, heating and power: A reduction of ¼d. per kWh.

Luton.—The increase of 66⅔ per cent. made owing to the coal dispute has been removed.

Radcliffe.—The temporary increase due to the coal strike has been withdrawn.

**South Africa.**—Bloemfontein (O.F.S.).—The new power station was formally inaugurated by the Administrator of the Orange Free State on March 24th. The erection of the station was commenced in March, 1925, and has cost £180,000. The plant includes two 3,000-kW sets, and the work was carried out by Messrs. Clarke & Partner, of Johannesburg.

**South-East Lancashire Electricity Advisory Board.**—The Board has decided that a committee be appointed to consider various methods by which some measure of district control could be secured, either by means of the delegation of powers by the Central Electricity Board, or otherwise, with a view to reporting when the scheme for this district is formulated by the Central Board as to any change which might then be possible or desirable in the organisation of the district.

**Southend-on-Sea.**—New Cable.—The Electricity Committee has informed the Highways and Works Committee that it proposes to lay a main past Belfairs and Kent Elms Corner, and thence to Southbourne Grove, at an estimated cost of £3,060. Application has been made for a Special Order authorising the supply of electricity to premises which are situated outside the borough boundary, and it is anticipated that the work of laying the cable will commence as soon as such powers are obtained.

**Special Orders.**—Application has been made to the Electricity Commissioners for a Special Order by the Tonbridge Urban District Council authorising it to extend its area of electricity supply so as to include the parish of Hildenborough and part of the parish of Leigh.

The Commissioners have submitted to the Minister of Transport for confirmation Special Orders made by them authorising the Porlock and District Electric Supply Co., Ltd., to supply electricity in part of the rural district of Williton, and the Electrical Distribution of Yorkshire, Ltd., to supply in the urban districts of Altofts, Ardsley East and West, and Methley, the rural district of Wakefield, and part of the rural district of Tadcaster.

**Swansea.**—School Lighting.—At a recent meeting of the Education Committee it was reported that at a joint conference between representatives of committees, together with the borough treasurer, the borough electrical engineer and the borough architect had decided to make the following recommendations with regard to the wiring of schools for electric lighting:—That the director of education and the borough treasurer be authorised to explain to the Board of Education the authority's scheme for the electric wiring of all its schools during the present year instead of spreading the work over a period of about 15 years; that on securing the approval of the Board of Education, application be made to the Ministry of Health for sanction to a loan to cover the cost of the work; that the borough electrical engineer be authorised to arrange that Sketty, Cwmbwrla Boys' and Morriston Boys' Council schools be wired forthwith.

# Tramway and Railway Notes.

**Argentina.**—Buenos Aires.—Lord Ampthill has arrived at Buenos Aires. It is understood that the main object of his visit is in connection with plans for the construction of an underground railway and new tramways, the award of the contract for which has been held up for a long time owing to the inability of the local authorities to agree as to the apportionment of the cost.—*Reuter* (Buenos Aires).

**Brazil.**—Railway Electrification.—The Companhia Paulista has decided to electrify a further 93 km. of its railway, from Rio Claro to Sao Carlos-de-Pinhal. Contracts for materials for the electrification of this section, as well as that to Rincon, a further 82 km., have been placed. The company has under consideration the electrification of the section Campiñas-Casa Branca section of the Magyana railway (172 km.).—*Reuter's Trade Service* (Sao Paulo).

**Burnley.**—New Route.—The Corporation tramway extension past the Turf Moor football ground was inaugurated on April 14th. For the present single-deck cars will be run.

**Continental.**—Austria.—It is reported from Vienna that the new National Council will be occupied with a scheme prepared by the large electrical companies and the Vienna banks for the conversion to electric traction of further railways, including those between Vienna and Salzburg, Vienna and Graz, and the Tauern line. The total expenditure is estimated at 310,000,000 schillings, and the execution of the scheme would lead to an economy of 540,000 tons of coal per annum.

Switzerland.—The Geneva correspondent of *The Times Trade and Engineering Supplement* reports that electrification is steadily progressing on the Lausanne-Berne line (61 miles), and electrically-driven trains are now running on the Lausanne-Romont section (25½ miles). It is expected that the conversion will be completed between Lausanne and Berne by May 15th, when about 20 minutes will be saved on the journey, which now takes two hours. Between Lausanne and Romont the line rises 853 ft., and in spite of steep gradients an electric locomotive was able during recent trials to haul a 200-ton train at a speed of 40 miles an hour on the steepest section and at a speed of 50 miles an hour on the Palezieux-Romont section. The conversion of the Lausanne-Berne section will mean the complete electrification of the Geneva-Berne-St. Margarethen line, linking France with Austria across Switzerland.

Holland.—The municipal authorities of Rotterdam have decided to take over the tramway undertaking owned by the Rotterdam Electric Tramways Co.

**Glasgow.**—Tramcar Improvements.—A report by the tramway manager on the rolling stock of his department states, with regard to lighting, that owing to the cheap rate, the cost of lighting is not great, and he recommends that four circuits, instead of three, should be the standard in future. For some time the department has been experimenting with 100-V, 40-watt internally-frosted lamps. These have given good results so far as improved illumination is concerned, but the "mortality" has been very high. Further experiments are still being conducted with a view to ascertaining the best type of lamp for cars. Experiments in heating are also being made, and firms have asked to be allowed to demonstrate their ideas on two cars.

**Preston.**—Permanent-way Renewals.—The Tramways Committee has recommended permanent-way renewals amounting to £10,020 during the current year. The amount includes £4,000 for permanent-way renewal from the borough boundary to Moor Park Avenue, £900 for permanent-way between the Beech Grove Co-operative and Ashton terminus, and £800 for permanent-way between Fulwood Hall Lane and barracks. Four cars are to be reconstructed at a cost of £2,400.

**Pontypridd.**—Inquiry.—On behalf of the Minister of Transport, Mr. A. D. Erskine recently held an inquiry at the Municipal Buildings into the application for sanction to extend the tramway to Rhydyfelin. According to the *Western Mail*, Mr. H. L. Porcher, clerk to the Council, referred to the houses which had been built at Rhydyfelin, and to the fact

that in this particular part of the district there were many residents who worked at collieries long distances away. The extension would be a great convenience, and there would be a corresponding benefit to the town generally and to the tramway undertaking. Mr. J. E. Teasdel, chief electrical engineer to the Council, said no additional plant or supplementation of the staff would be required if the Council's application were granted, and the running of the tramway would be made simpler. The Ministry will give its decision in due course.

**Sheffield.**—NEW CARS.—The Corporation is to build 25 double-deck tramcars in the Corporation works, and another 25 are to be bought under contract. The total cost will be £117,500.

# Telegraph and Telephone Notes.

**India.**—AUTOMATIC SATELLITE TELEPHONES.—With a view to extending telephony in India, by providing exchanges in outlying towns and villages, the Indian Telegraph Department has been experimenting with a 10-line automatic exchange, the switchboard of which is connected by a short trunk line to the nearest telephone centre, all the calls both to and from subscribers on the outlying "satellite" exchange being dealt with by the operator in the central exchange. One such switchboard was installed on trial in Kalka last December, and was so successful that four more are now being installed in the same district; they will be watched with much interest, for the system, if successful under service conditions, will open up possibilities for development in an untapped field. The installation of a set in Bombay recently also gave satisfaction.

**New Zealand.**—AUTOMATIC TELEPHONY.—A new automatic telephone exchange at Stratford, New Zealand, has been completed by Siemens Bros. & Co., Ltd., Woolwich, and was opened on the 8th instant. The exchange has an initial equipment for 600 ordinary lines and 50 rural and party lines, with an ultimate capacity of 900 and 100 respectively. The exchange equipment includes a two-position manual board and a one-position test deck. The automatic equipment is the No. 16 type with several novel and interesting features, which include revertive calling on 4-party lines and special signalling arrangements for the rural lines.

# Radio Notes.

**Irish Free State.**—CORK STATION.—The new State broadcasting station at Cork, which is intended to serve the south and west of the country, was officially inaugurated on April 25th by Mr. J. J. Walsh, Minister for Posts and Telegraphs. Equipped with "Standard" plant, the Geneva rating of the station is 1.5 kW, which means that 4-kW "peak" power can be handled without distortion. It will operate on a wave-length of 400 metres and its call sign is 6CK.

LICENCE REVENUE.—In Dail Eireann, Mr. Ernest Blythe, Minister for Finance, said that the yield from the duty on wireless-telegraphy apparatus in the Irish Free State from April 22nd, 1926, the date of the imposition of the duty, up to and including March 31st, 1927, was £19,008. The total amount received from licences on wireless receiving sets for the first three months of the present year was £8,315, *viz.*, for January last, £2,432; for February, £4,527; and for March, £1,356. The number of receiving licences issued in the Free State during the financial year ended March 31st, 1927, was 21,795. The figure for Northern Ireland was 28,455 up to February 28th, 1927.

**Long-wave Stations.**—INTERFERENCE TESTS.—Capt. P. P. Eckersley, chief engineer of the B.B.C., and M. Braillard, the Belgian president of the Technical Committee of the Union Internationale de Radiophonie, have co-operated in carrying out tests recently to ascertain the amount of wave-length separation needed between long-wave high-power stations in order to avoid interference between them. At its meeting at Geneva next month the Union will consider the results of the investigation. A 10-kilocycle interval between stations is apparently as essential in the case of long-wave stations as it is in that of the shorter band, while it seems to be not really sufficient between two powerful stations geographically "near" to each other.

**U.S.A.**—FEWER STATIONS ADVOCATED.—A plan for the reduction of the number of broadcasting stations in the United States from 733 to 364 has been submitted by the American Engineering Council to the Federal Radio Commission, says *World Radio*. Under the scheme there would be 64 national stations and 300 local stations; the former would operate in the band between 550 and 1,250 kilocycles, that is to say, from 240 metres to 545 metres; the local stations would be confined to the range of from 1,250 to 1,500 kilocycles, or from 240 down to 200 metres. The proposal has the support of many radio engineers and was worked out by the Radio Broadcasting Committee of the Engineering Council.

# Contract Information.

**When "Contracts Open" are advertised in our "Official Notice" pages, the date of the ELECTRICAL REVIEW containing the advertisement is given in parentheses below.**

## Contracts Open.

**Australia.**—MELBOURNE.—June 1st. Victorian Government Railways. Electric time-releasing mechanisms. (B.X. 3431.)*
July 5th. State Electricity Commission. One 15,000-kW steam turbo-generator and accessories. (B.X. 3369.)*
Tensioning and suspension-type insulators. (B.X. 3455.)*
SYDNEY.—June 22nd. New South Wales Government Railways. Remote-control switchgear. (B.X. 3442.)*
June 20th. Municipal Council. Turbo-alternators for Bunnerong power station. (B.X. 3443.)*
BRISBANE.—May 18th. City Electric Light Co., Ltd. Outdoor switchgear. (B.X. 3456.)*

**Barking.**—May 9th. County of London Electric Supply Co., Ltd. Cables and accessories for the Barking power station. (April 1st.)

**Belgium.**—May 3rd. Department des Ponts et Chaussées, 15, Rue de la Charité, Brussels. Electrical and mechanical equipment for the Kruisschans Dock, Antwerp. Particulars (Cahier des Charges et Plans) for 52 fr., from 15, Rue des Augustins, Brussels.

**Darton.**—May 17th. West Riding Education Committee. Electric lighting installation at Darton Kexborough new school. Specifications from Education Department, County Hall, Wakefield.

**Durrington (Wilts.).**—April 30th. Wiring 30 houses, for the Durrington Electric Light Co., Ltd. Mr. S. N. Bigwood, secretary, Midland Bank Chambers, Salisbury.

**Edinburgh.**—May 2nd. District Board of Control. Electricians' work at new buildings at Gogarburn Institution. Mr. Stewart Kaye, architect, 14, Hill Street, Edinburgh.

May 16th. East Lothian Education Authority. Works, including electric lighting installation, for the extensions, &c., at Macmerry Public School. Schedules from the surveyors, Messrs. R. & A. K. Smith, 44, Queen Street, Edinburgh.

**Egypt.**—CAIRO.—May 24th. Director-General of Prisons. Twelve months' supply of electric lamps, &c. (C.X. 2268.)*

**Grimsby.**—May 2nd. Electricity Department. E.h.p. and pilot cables; l.p. feeder cables. (April 15th.)

**London.**—ST. MARYLEBONE.—May 18th. Electricity Department. L.p. and e.h.p. cables for 12 months. (April 15th.)
ISLINGTON.—June 1st. Electricity Department. Steel-tube lamp columns, 2,200-V feeder switchgear, rotary and/or static power factor correctors. (April 22nd.)
METROPOLITAN ASYLUMS BOARD.—May 18th. Installation of a multiple roller ironing machine; new steam boiler, &c.; steam main; electric power in laundry, &c., at Darenth Tramway Colony; conversion of mechanical stokers to hand firing at North-Eastern Fever Hospital. (See this issue.)

**Manchester.**—May 5th. Electricity Committee. Twelve months' supply of electric kettles, potential and current transformers, electricity meters, and cable supplies. (April 22nd.)
May 3rd. Stores required during the 12 months ending June 30th, 1928. Mr. H. C. Lamb, chief engineer and manager, Electricity Department, Town Hall.

May 10th. Tramways Committee. Trucks, motors, and controllers for electric tramcars; tramway poles, span-wire brackets, trolley wire, and copper bonds. Mr. H. Mattinson, general manager and chief engineer, 55, Piccadilly, Manchester.

**New Zealand.**—Wellington.—June 21st. Public Works Department. Sub-station switchgear and metering equipment for Arapuni. (B.X. 3398.)*

June 7th. Railway sub-station equipment, Lake Coleridge electric power scheme. (B.X. 3295.)*

June 13th. New Zealand Railways. Machine tools, workshop equipment and overhead electric travelling cranes. (A.X. 4344.)*

June 6th. Six electric locomotives. (A.X. 4355.)* Overhead equipment for the Christchurch-Lyttelton electrification scheme. (B.X. 3301.)*

Invercargill.—May 31st. Southland Electric Power Board. Transformers. (B.X. 3379.)*

June 15th. 66,000-V oil circuit-breakers. (B.X. 3378.)*

Lyttelton.—July 20th. Harbour Board. Four 5-ton electrically-operated portal cranes, and ten electrically-operated capstans. (A.X. 4532.)*

**Sleaford.**—May 17th. Electricity Department. Cables, boxes, &c. (See this issue.)

**South Africa.**—Cape Town.—June 1st. The University. Electric cooking utensils for the new residences at Groote Schuur. (B.X. 3393.)*

**Scarborough.**—June 3rd. Corporation. Installation of electrical pumping plant in duplicate for the new Irton water scheme No. 2. Specifications (£5) from Dr. H. Lapworth, engineer, 25, Victoria Street, S.W.

**Thorne.**—May 17th. West Riding Education Committee. Electric lighting installation at new boys' school. Specifications, &c., from Education Department, County Hall, Wakefield.

**Uruguay.**—Montevideo.—June 15th. State Electricity Supply Works. 15 transformer sub-station equipments (6,600/220 V, 50 cycles). (B.X. 3371.)* Five overhead transformer sub-stations mounted on tubular or section iron columns. (B.X. 3430.)*

*Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

# Contracts Closed.

**Australia.**—Sydney.—Electricity Supply Committee. Recommended:—

Bare copper cable (Spec. 1095), £6,552; double-braided weatherproof cable (Spec. 1090), £5,351.—Enfield Cable Works (Aust.), Ltd. —*Tenders.*

**Barnsley.**—Board of Guardians. Accepted:—

Electrical work at the Institution.—Brown & Roberts.

**Bury St. Edmunds.**—Board of Guardians. Accepted:—

Installing electric lighting at the Institution (£345).—Wood & Co.

**Chesterfield.**—Rural Council. Accepted:—

Electrical installation in connection with the sewage disposal works (£1,457).—British Thomson-Houston Co., Ltd.

Electric travelling crane and railway (£511).—Thomas Smith & Sons (Rodley), Ltd.

**Government Contracts.**—The following contracts were placed by various Government departments during March, 1927:—

Admiralty, Contract and Purchase Department.

Motor alternators.—Small Electric Motors, Ltd.

Alternators and spare armatures.—Newton Bros. (Derby), Ltd.

W./t. amplifiers.—The Plessey Co., Ltd.

Turbine blading materials.—J. Wilkes, Sons & Mapplebeck, Ltd.

W./t. boards.—Park Royal Engineering Co., Ltd.; Veritys, Ltd.; W. McGeoch & Co., Ltd.

W./t. coils.—H. W. Sullivan, Ltd.; Gambrell Bros., Ltd.; Radio Instruments, Ltd.

Motor convertors.—Brush Electrical Engineering Co., Ltd.

Electric crane.—T. Broadbent & Sons, Ltd.

Ventilating fans.—Newton's Dynamo Works; James Keith & Blackman Co., Ltd.; Veritys, Ltd.

Electric fires.—Berry's Electric, Ltd.

W./t. fittings.—W. McGeoch & Co., Ltd.; J. Stone and Co., Ltd.; Highton & Son, Ltd.; Park Royal Engineering Co., Ltd.

Motor generators and panels.—W. H. Allen, Sons and Co., Ltd.

Cable installation.—G. E. Taylor & Co.

Electric lighting installation.—G. E. Taylor & Co.

600-h.p. motor.—Brush Electrical Engineering Co., Ltd.

Main and auxiliary propelling motors.—Metropolitan-Vickers Electrical Co., Ltd.

Motor-driven submersible pump.—W. H. Allen, Sons and Co., Ltd.

Electric radiators.—Edison Swan Electric Co., Ltd.

Automatic starters, resistances and switches.—Watford Electric & Mfg. Co., Ltd.

W./t. switches and circuit breakers.—General Electric Co., Ltd.; Park Royal Engineering Co., Ltd.; Whipp and Bourne, Ltd.; Veritys, Ltd.

Telephone leads.—Ward & Goldstone, Ltd.

Terminal blocks.—Edison Swan Electric Co., Ltd.

W./t. valve holders.—H. W. Sullivan, Ltd.

W./t. valves.—General Electric Co., Ltd.; Mullard Radio Valve Co., Ltd.; Edison Swan Electric Co., Ltd.

War Office.

W./t. valves.—General Electric Co., Ltd.; British Thomson Houston Co., Ltd.

Electric lighting installations (Cameron Barracks, Inverness).—Watson & Dundas.

Air Ministry.

Battery (North Weald).—Premier Accumulator Co. (1921), Ltd.

Engines and generators (Bicester).—Tangyes, Ltd.

Internal wiring (Upper Heyford).—Read & Partners.

Underground mains (Sutton's Farm).—Watshams, Ltd.

Air-driven generators and spares.—W. Mackie & Co., Ltd.; G. E. Mortley, Sprague & Co., Ltd.

Magnetos and spares.—British Thomson-Houston Co., Ltd.

Receivers.—The Plessy Co. (1925), Ltd.

Syntonisers.—Radio Instruments, Ltd.

Transmitters.—C. A. Carter & Co.

Post Office.

Telegraph apparatus.—Creed & Co., Ltd.

Telephone apparatus.—Ericsson Telephones, Ltd.; International Electric Co., Ltd.; Phœnix Telephone and Electric Works, Ltd.; Siemens Bros. & Co., Ltd.; Standard Telephones & Cables, Ltd.; Sterling Telephone & Electric Co., Ltd.

Testing, protective and miscellaneous apparatus.—Automatic Telephone Mfg. Co., Ltd.; British Thomson-Houston Co., Ltd.; Power Equipment Co., Ltd.

Battery stores.—General Electric Co., Ltd.; C. A. Vandervell & Co., Ltd.

Service boxes.—Horstmann Gear Co., Ltd.

Cable (various).—British Insulated Cables, Ltd.; Callender's Cable & Construction Co., Ltd.; Connollys (Blackley), Ltd.; Hackbridge Cable Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Pirelli-General Cable Works, Ltd.; Standard Telephones & Cables, Ltd.

Compound.—W. H. Keys, Ltd.

Cords for telephones.—British Insulated Cables, Ltd.; Reliance Electrical Wire Co., Ltd.; Standard Telephones & Cables, Ltd.

Cable drums.—Eames Bros.; Hackbridge Cable Co., Ltd.; Siemens Bros. & Co., Ltd.

Ducts.—Albion Clay Co., Ltd.; Donington Sanitary Pipe and Fire Brick Co., Ltd.; Hepworth Iron Co., Ltd.; J. Oakes & Co. (Riddings Collieries), Ltd.; Oates and Green, Ltd.; J. Place & Sons, Ltd.; Standard Brick & Terra Cotta Co., Ltd.

Generating set.—W. Beardmore & Co., Ltd.

Lamps.—General Electric Co., Ltd.

Cable distribution plugs.—Siemens Bros. & Co., Ltd.

H.d. copper wire.—Nevill, Druce & Co., Ltd.; Enfield Cable Works, Ltd.; R. Johnson, Clapham & Morris, Ltd.; Pirelli-General Cable Works, Ltd.; Whitecross Co., Ltd.

Replacing batteries (Blackpool telephone exchange).—Chloride Electrical Storage Co., Ltd.

Manufacture, supply, drawing-in and jointing cable.—London-Purley-Redhill-Reigate: Standard Telephones and Cables, Ltd. Hitchin-Letchworth: Johnson and Phillips, Ltd.

Lift (Manchester H.P.O.).—W. Wadsworth & Sons, Ltd.

Telephone exchange equipment.—Garston (Liverpool): Automatic Telephone Mfg. Co., Ltd. Sub-contractors: Alton Battery Co., Ltd., for batteries; Newton Bros. (Derby), Ltd., for machines. Metropolitan: Automatic Telephone Mfg. Co., Ltd. Sub-contractors: D.P. Battery Co., Ltd., for batteries; Newton Bros. (Derby), Ltd., for charging machines; Crompton & Co., Ltd., for ringing machines. Chancery, Ambassador, Cosham (Portsmouth multi office area), Bishop's Stortford, Roundhay (Leeds), and Synthetic

Ammonia & Nitrates, Ltd. (Norton, near Middlesbrough): Automatic Telephone Mfg. Co., Ltd. Rainham (Essex): Ericsson Telephones, Ltd. Sub-contractors: D.P. Battery Co., Ltd., for batteries; Crompton & Co., Ltd., for machines. Lee Green, and E. & F. Beattie, Ltd. (Manchester): Standard Telephones & Cables, Ltd. Horsham: General Electric Co., Ltd. Ecclesfield (Sheffield multi exchange area): Siemens Bros. & Co., Ltd. Royal Berkshire Hospital (Reading), Bristowes Tarvia, Ltd. (S.W.1), Trades Union Congress and Labour Party (S.W.1), and Liptons, Ltd. (E.C.1): Automatic Telephone Co., Ltd.

Two- and four-wire repeater station equipment.—Halesworth: Standard Telephones & Cables, Ltd. Taunton: General Electric Co., Ltd.

Spark transmitter (Seaforth wireless station).—Radio Communication Co., Ltd.

CROWN AGENTS FOR THE COLONIES.

Cables.—St. Helens Cable & Rubber Co., Ltd.; British Insulated Cables, Ltd.

Electrical material.—General Electric Co., Ltd.

Switching equipment.—Metropolitan-Vickers Electrical Export Co., Ltd.

Telegraph materials.—Siemens Bros. & Co., Ltd. Bullers, Ltd.

Telephone material.—Standard Telephones & Cables, Ltd.; Peel-Conner Telephone Works, Ltd.

Train-lighting spares.—Pritchett & Gold & E.P.S. Co., Ltd.; Chloride Electrical Storage Co., Ltd.; J. Stone and Co.

Transformers.—British Electric Transformer Co., Ltd.

Turbine, &c.—Sir W. G. Armstrong, Whitworth & Co., Ltd.

H.M. OFFICE OF WORKS.

Wiring Marlborough House, S.W.—H. J. Cash & Co., Ltd.

Wiring Princes Risborough Laboratory.—Electrical Installations, Ltd.

Transformers, National Physical Laboratory.—British Electric Transformer Co., Ltd.

**Grimsby.**—Electricity Committee. Recommended:—

Balancer, switchgear, and cable work in connection with Deansgate sub-station (£505).—J. H. Holmes & Co., Ltd.

**Irish Free State.**—Department of Posts and Telegraphs.

Telephone cabinets.—Siemens Brothers & Co., Ltd.

Cable racks, various.—Standard Telephones & Cables, Ltd.

Dials (for automatic telephones).—Peel-Conner Telephone Works, Ltd.

Electric lamps.—Cossor, Ltd.; Sphinx Electric Supplies, Ltd.

Electric motors.—General Electric Co., Ltd.

Stay-rods.—Bayliss, Jones & Bayliss, Ltd.

Telephone wire.—Fernand Espir.

**Kettering.**—Electricity Department. Accepted:—

E.h.p. and l.p. armoured cables.—Union Cable Co., Ltd.

1,000-kVA transformer.—British Electric Transformer Co., Ltd.

300- and 250-kVA transformers.—Brush Electrical Engineering Co., Ltd.

**King's Lynn.**—

Electrification of the new sugar-beet factory. The installation will include some 84 electric motors (approx. 2,138 h.p.), with the necessary control gear, main switchboard, and the complete electric lighting installation of the factory.—Mann, Egerton & Co., Ltd.

**London.**—STEPNEY.—Electricity Supply Committee.

Centrifugal oil purifier (£116).—Empson Centrifugals, Ltd. (Recommended.)

2 tons plumber's solder (£284).—H. B. Barnard & Sons. (Accepted.)

2 tons sheet lead (£71).—Page, Calnan & Co., Ltd.

Works Committee.

Electric ash hoist, with steel supporting structure (£268).—London Hoist & Machinery Co. (Recommended.)

The EDISON SWAN ELECTRIC CO., LTD., has received contracts for accumulators from the London County Council, and for No. 2 E.C.C. dry cells from the Metropolitan Railway Co.

LAMP CONTRACTS.—The contract for "Cosmos" lamps received recently by Metro-Vick Supplies, Ltd. (see ELEC. REV., April 15th, p. 604), was placed by the London & North-Eastern Railway Co., and not the L. & N.W.R. Co.

**Mansfield.**—CORPORATION.—The Corporation last week decided to accept the tender of the Netherlands Cable Works, Ltd., for the supply of low-pressure cables. It is stated that the quotation was 20 per cent. below those of British firms.

**Portsmouth.**—Electricity Committee. Recommended:—

Installation of coal-handling plant at power station (£13,460).—Babcock & Wilcox, Ltd.

**Reigate.**—Corporation. Accepted:—

One 6-cylinder 1,715 b.h.p. Mirrlees-Diesel engine.—Mirrlees, Bickerton & Day, Ltd.

It is stated this will be the largest oil engine supplied to any electricity undertaking in this country.

**Southend-on-Sea.**—Town Council. Accepted:—

E.h.p. cables for the linking-up of the Leigh, London Road, and Thorpe Bay sub-stations (£31,752).—International Combustion, Ltd.

Five police and fire-alarm posts (£237).—Standard Telephones & Cables, Ltd.

De Laval centrifugal oil purifier for Diesel engine (£157).—Alfa De Laval Co., Ltd.

**Swinton and Pendlebury.**—Urban District Council. Accepted:—

H.p. cubicle (£182); a.c. l.p. switchboard (£450).—General Electric Co., Ltd.

**Tynemouth.**—Electricity Committee. Accepted:—

Meter boards.—J. Pelton.

Three 250-kVA transformers (£597); one 500-kVA transformer (£335).—Bruce Peebles & Co., Ltd.

ELECTRICITY COMMITTEE.—The electrical engineer reported at a meeting of the Committee that a tender for cable from a Dutch firm was £483, as compared with £587, the lowest British quotation. The Committee decided that when small supplies of cable are required, foreign tenders shall be invited.

**Weymouth.**—Housing Committee. Accepted:—

Wiring 94 houses on the Westham estate (£5 10s. per parlour house and £5 per non-parlour house) (screwed steel-tube system).—H. V. Bennett & Co.

# Forthcoming Events.

**Institution of Engineering Inspection.**—Friday, April 29th. Royal Society of Arts. 7.30 p.m. "The Stress-strain Diagram and its Application to the Testing of Rolling Stock Drawgear." Mr. L. H. Evans.

**Royal Institution of Great Britain.**—Friday, April 29th. 9 p.m. "Wireless Transmission and the Upper Atmosphere." Dr. E. V. Appleton.

**Junior Institution of Engineers.**—Friday, April 29th. 39, Victoria Street, S.W. 7.30 p.m. "The Design and Balancing of Three-phase Low-tension Distribution Systems." Mr. W. F. Cooper.

Friday, May 6th. 7.30 p.m. Question and discussion evening.

**Society of Engineers.**—Monday, May 2nd. Burlington House, W. 5.30 p.m. "The Internal Combustion Boiler." Mr. O. Brunler.

**Royal Society of Arts.**—Monday, May 2nd. 8 p.m. Cantor Lecture. "The Measurement of Light." Mr. J. W. T. Walsh. (Lecture II.)

**Röntgen Society.**—Tuesday, May 3rd. 32, Welbeck Street, W.1. Ordinary meeting.

**Institution of Civil Engineers.**—Tuesday, May 3rd. London, S.W. 6 p.m. James Forrest Lecture. "Some Recent Services of Metallurgy to Engineering." Prof. H. C. H. Carpenter, F.R.S.

**Association of Supervising Electrical Engineers.**—Tuesday, May 3rd. 39, Victoria Street, S.W. 7.15 p.m. "Items of Practical Importance in Mining Electrical Engineering." Mr. E. J. Davies.

**Institution of Electrical Engineers.**—Thursday, May 5th. London. 6 p.m. Annual general meeting.

**(Wireless Section).**—Wednesday, May 4th. London. 6 p.m. Ordinary meeting.

**(South-Midland Students' Section).**—Tuesday, May 3rd. Annual general meeting.

**Chemical Engineering Group.**—Friday, May 6th. Imperial College of Science, South Kensington, S.W. 6 p.m. Annual general meeting. 8 p.m. "Chemical Fire Extinguishers." Dr. W. R. Ormandy.

# The "Electrical Review" Service Department.

**INQUIRIES must be accompanied by a stamped addressed envelope.**

**We should be glad to learn the names and addresses of makers of the following:—**

U.L.A. portable electric tools.

"D" type conduit clips as originally handled by Massey and Rothschild, of Birmingham.

ALUMEL wires (aluminium alloys, known also as Hoskins' alloy).

LANGWELL electric light fittings.

PERKINS YANKEE switches.

CLIMAX vacuum cleaners.

We also wish to know:—

The present address of the Continental Automatic Telephone & Electric Co. (spare parts are wanted).

Whether any agency exists in this country for the Estate Stove Co., U.S.A.

# Notes.

### The Southern Railway Contract.

In the House of Commons on Tuesday last, in reply to a question by Mr. R. Morrison (Lab.), Sir B. Chadwick, Parliamentary Secretary to the Board of Trade, said that he had no information regarding the Southern Railway contract beyond what had appeared in the statements of the Railway Company and the General Electric Co., Ltd. They appeared to set out all the essential facts, and he did not think a special inquiry would be likely to serve any useful purpose.

### Accident.

An explosion occurred in an underground electric chamber in Falcon Square, Aldersgate Street, E.C., just before noon on April 25th, and the electricity supply in the surrounding area failed. Three electricians employed by the City of London Electric Lighting Co., Ltd., were in the chamber, and one of them, who was seriously burned about the face, was conveyed to St. Bartholomew's Hospital. The electricity supply was resumed shortly before 1 p.m.

### Poplar Electricity Undertaking.

The new generating station of the Metropolitan Borough of Poplar, which is described elsewhere in this issue, was thrown open for inspection on Monday morning last, April 25th, when Sir Andrew Duncan, chairman of the Central Electricity Board, performed the opening ceremony; the speeches were amplified by means of Graham "Amplion" loud-speakers, and an exhibit of domestic electrical apparatus was arranged by the G.E.C., which also demonstrated a 10-kW incandescent lamp. A very large company subsequently assembled at the Hotel Cecil for luncheon, the speakers being Sir Andrew Duncan, Councillor C. W. Key, chairman of the Electricity Committee, Alderman George Lansbury, Mr. J. H. Bowden, engineer and manager of the undertaking, Alderman Samuel March, Sir Duncan Watson, Mr. Frank Hodges, Councillor R. Bond, vice-chairman of the Electricity Committee, Sir Hugo Hirst, and Mr. Geo. C. Usher. With coal of 11,000 B.th.u. thermal value, suitable for mechanical stoking, costing 20s. per ton (which is equivalent to the purchase of 102,700 B.th.u. per one penny), the existing plant's fuel consumption per kWh delivered to the feeders is at the rate of 33,000 B.th.u., the cost being 0.323d. per kWh. With coal of a similar thermal value, but costing 16s. per ton and fired in the pulverised form (which is equivalent to the purchase of 128,000 B.th.u. per one penny), the new plant will, it is estimated, be capable of delivering energy to the feeders at a cost of 0.143d. per kWh. Thus, a reduction of fuel cost of 0.18d. per kWh is anticipated. A condition of the contract having been that a proportion of the cost should be expended locally, it was decided to install one Bradley pulverising equipment, which is of American origin, but was made locally by the East Ferry Road Engineering Co.

### Educational.

The Polytechnic, Regent Street, Electrical Engineering Department.—A special course of six lectures on the "Thermionic Valve and its Uses in Wireless Circuits," will be delivered by Mr. W. H. Date, on Wednesdays, commencing May 11th, from 6.30 to 8.30 p.m. On Thursdays, commencing May 12th, at 6.30 p.m., Mr. W. J. Bolton will deliver a special course of lectures on "Electrical Engineering Economics." Particulars and syllabus can be obtained from the Director of Education.

### Irish Free State Electricity Supply.

The Irish Free State Government's proposal to take over the control of the municipal and other electrical undertakings in the State under the new Electricity Supply Bill, absorbing them as part of the Shannon hydro-electric scheme, and to refuse compensation to the present owners, continues to excite keen indignation in Dublin and other cities and towns, chiefly because of the confiscatory character of the plan. It is held that if the undertakings are to be taken over, full compensation should be paid for the important developments that have been made, largely at the expense of the ratepayers, but in many instances through heavy outlay by public or private companies or private individuals. Mr. M'Gilligan, the Minister for Industry and Commerce, in a recent speech, contended that there was little danger of contractors being put out of business through the operation of the Government measure, and estimated that in the wiring of houses there would be sufficient work to keep 5,000 men employed for two and a-half years. Assurance has been given that the cost of the Shannon scheme will not exceed the original estimate of £5,210,000. The Minister has sanctioned the raising of a loan of £90,000 for the provision of boiler plant and accessories, this being part of a loan of £475,150 applied for by the Dublin City Commissioners.

In the Dublin Chamber of Commerce recently it was made clear that before the Shannon scheme could pay, the consumption would have to reach 110,000,000 units per annum; Dublin's share of this will be about 50 per cent. The consumption now is calculated at 75,000,000 units, with a possible increase to 80,000,000 in 1929. Extraordinary efforts, the Minister urged, must be made to stimulate demand. He denied that the Dublin power station was to be "seized" with the object of giving cheap power to consumers elsewhere. A clause which he had undertaken to insert in the Bill would provide that the cost of distribution would be proportionate to the liability taken over from the particular area.

At a meeting of the Emergency Committee of the Municipal Authorities' Association of Ireland, a resolution was passed claiming for municipalities that have established electricity undertakings in the Free State the status outlined in the original report of the Government's expert advisers, under which such municipalities were to have the option of taking current from the Shannon or generating it themselves, and were in either event to act as the local distributing authorities.

A new sub-section has been put down providing that where an undertaking to be taken over has received money from the rates, the money still owing shall be repaid by the new undertaker in a number of years.

The Minister also proposes amendments to meet the objections taken by electrical contractors in the Free State to the Bill's provisions as to the purchase and sale of electrical apparatus and appliances. It would appear that the Board of Control is not, as at first supposed, to sell apparatus and appliances under cost, but it is contended that sale at cost would kill the ordinary contractor.

### Association of Supervising Electrical Engineers.

The recognised standing of this Association (until lately the National Association of Supervising Electricians) has resulted in many cases of misuse by unauthorised persons of the Association's abbreviation and claims to membership, by persons who either have not been members or have been struck off the roll. In several cases it has been necessary to institute legal proceedings to safeguard the interests of the Association. With a view to avoiding a recurrence of such happenings, it has been decided to issue yearly membership cards, the colour of the cards varying each year and the date of currency being plainly printed thereon. The colour for the year ending December 31st, 1927, is turquoise blue, and persons claiming membership of the Association should be asked to produce their current membership cards. Cases of misrepresentation should be reported to the Association.

### Fires.

A fire occurred on April 23rd, at the premises of Messrs. Wigglesworth & Crossley, electricians, Keighley Road, Frizinghall, Bradford. It is believed the fire was due to overheating of a heating appliance, setting fire to the floor and extending to the basement.

A fire occurred on April 14th at the premises of Messrs. H. White & Co., wireless engineers, of Siddals Road, Derby. The building was gutted, and a large quantity of wireless and electrical material was destroyed.

### The Batti-Wallahs' Society.

At a well-attended luncheon at the Hotel Cecil, on Tuesday last, Sir Arnold B. Gridley unfolded an original scheme intended to reconcile relations between the consumer, the producer, and the wage-earner—rather to stimulate thought on new lines, than as a completely developed plan. Success, he held, would come if they curbed the spirit of gain and expanded the spirit of service. Mr. A. W. Blake presided, in the absence, through ill-health, of the new president, Mr. G. W. Partridge, who sent a cordial message of apology and good wishes.

### Legal.

Wareham Electric Supply Co., Ltd.—In the Chancery Division on April 26th, the petition of Mr. W. E. Weston for the compulsory winding up of this company again came before Mr. Justice Eve. Mr. Galbraith, K.C., appeared for Mr. Edwards, who was the liquidator in the voluntary liquidation of the company commenced in 1923, but stayed. Mr. Edwards knew nothing of the subsequent proceedings, and asked for his costs. Mr. Willis, for the petitioner, said that it had been hoped that the case, which was a serious one, would be investigated fully before his Lordship.

Mr. Justice Eve granted the usual compulsory winding-up order, and directed that Mr. Edwards's costs should be reserved if not paid out of the assets.

### International Conference on High-Pressure Systems.

The fourth session of the International Conference on Large Electric High-pressure Systems will be held in Paris from June 23rd to July 2nd next. The Conference is divided into three sections, namely, power production, construction of lines, and working of systems, and thus offers to all its members a rare opportunity of acquiring detailed information on matters of professional interest and to benefit by each other's experience in a much more effective manner than through the medium of books and periodical literature; it also enables them to meet personally and maintain friendly relations of the greatest value. Some 28 countries are represented in the membership. In 1925 a total of 530 members attended the Conference, of whom 242 were manufacturers of electrical material, 251 power distributors, and 37 professors or consulting engineers. Two languages are used at the meetings of the Conference, viz., English and French, and all papers and discussions are translated from the one to the other. Full particulars will be supplied on request by the General Secretary, Mr. Tribot Laspière, 25, Boulevard Malesherbes, Paris, France.

### Cables in Mines.

Important evidence relating to electric cables in mines was given recently at the inquest on the victims of the accident at Wharncliffe Woodmoor colliery, near Barnsley. A ripper stated that the electric cable was laid on the ground for about six yards to protect it during the work of ripping. A stone fell and brought down the cable at a point from which it was hung up. The cable fell on the rails and he saw some sparks. The men went to the pit bottom, a walk of about fifteen minutes, to turn off the power. They had been told by the overman to watch the cable, but they were not told how to watch and protect it. They were not told where the switches were to cut the power off. He was satisfied that the cable was cut on the rails. The overman said that at the time of the accident there were no switches between the scene of the fire and the pit bottom. He had given a warning always to have the cable sufficiently and properly covered. The inquiry was adjourned.

### Appointments Vacant.

Meter assistant for the Worcester Corporation Electricity Department. Motors and hiring superintendent (£312) for the Borough of Birkenhead Electricity Department. Clerk for the Bingley U.D.C. Electricity Department. Mechanical superintendent (£364) for the Sheffield Corporation Tramways. Junior scientific officer (£279) for the Air Ministry Scientific Research Staff. Sub-station switchboard attendant for the Ilkley Urban District Council Electricity Department. Visiting lecturer of electrical engineering for the London County Council Paddington Technical Institute. Charge shift engineer for the Yorkshire Electric Power Co. Junior technical officers for the Wireless Experimental Depôt of the Royal Aircraft Establishment. Mains engineer for the Calcutta Electric Supply Corporation, Ltd. (See our advertisement pages to-day.)

# Institution Notes.

### Institution of Electrical Engineers.

SOUTH MIDLAND CENTRE.—The report of the Committee for the 1926-27 session shows that interest in the activities of the Centre has been fully sustained during the session. The Faraday lecture was made the occasion of a joint meeting between the Institutions of Civil, Mechanical and Electrical Engineers, when some 1,150 members and visitors were present, and approximately 100 were unable to obtain admission. The meeting was followed by a conversazione at Birmingham, where the attendance was 360. In co-operation with the Institutions of Civil and Mechanical Engineers, the Committee is progressing as regards establishing a suitable meeting place, and efforts at the moment are being concentrated on obtaining a site in what will be known as a "Civic Centre" of Birmingham. The attendance at ordinary meetings averaged 125; the membership was 1,032, an increase of 50. The new session officers are as follows:—*Chairman*: W. Wilson; *vice-chairmen*: S. H. Holden, G. R. J. Parkinson; *ordinary members of the committee*: G. W. Billingham, W. Burton, R. A. Chattock, Capt. J. Coxon, Prof. W. Cramp, G. M. Harvey, R. G. Jakeman, J. D. Morgan, J. Morton, A. D. Phillips, F. C. Platt, G. Rogers, Dr. A. H. Railing, J. J. Swarsbrick. Wireless Section.—*Chairman*: J. D. Morgan.

*Wireless Section.*—Four meetings were held, the attendance at which was 28, 120, 41, and 28.

*Students' Section.*—The meetings numbered 8, and six visits to works, &c., took place.

EAST MIDLAND SUB-CENTRE.—Eight meetings were held, and the average attendance was 100. During the winter four visits to works were organised.

KELVIN LECTURE.—On April 21st Dr. E. W. Marchant delivered the 18th Kelvin Lecture, on "High-frequency Currents," showing how Kelvin laid the foundations of much of the work on oscillatory currents that was now commonplace, and developing the theory in its application to modern problems. A vote of thanks, moved by Mr. W. B. Woodhouse, and seconded by Mr. Ll. B. Atkinson, was passed by acclamation.

INFORMAL MEETING.—At the meeting held on April 11th, Mr. A. H. Allen was in the chair, when Mr. T. Hodge opened a discussion on "The Maintenance of Small Electric Power Plants." Mr. Hodge's remarks were mainly confined to factory and works installations, but the discussion extended to machine and line troubles in a variety of services. An interesting case of breakdown was described by Mr. Hodge where a 20-h.p. enclosed ventilated motor was set at work to drive several high-speed dry grindstones. After a few weeks the sparking at the brushes became so excessive that there was an occasional flash-over. Tests were made for insulation, and overload, the mica was undercut, the brush position was verified, and apparently everything was in order. Still the trouble remained, until on one occasion whilst the shunt field was excited separately, it was noticed that the gap between the pole faces and the iron of the armature was bridged over by small particles of iron and steel, which in floating about in the air, had been attracted by the magnetic field of the motor, although it was situated some 20 ft. away from the nearest grindstone, and not in any direct line with the dust given off.

In the course of the discussion, Mr. Burnand said that maintenance was not always intelligent. He knew of a case where an engineer regularly took down and cleaned his motors, and there were always many breakdowns, but when he was persuaded to be less zealous the breakdowns ceased. Mr. W. L. Wreford said that starter troubles varied inversely with the cost of the starter. Engineers often would pay for a good motor but would buy the cheapest starter obtainable.

### Association of Mining Electrical Engineers.

LONDON BRANCH.—At the annual general meeting of the London Branch of the Association on April 12th, it was stated that Mr. Humphrey M. Morgans would be the Branch-President for the year 1927-28.

### Royal Society of Arts.

The competition of industrial designs this year will be held at the Imperial Institute, South Kensington, S.W. Particulars of the scholarships and prizes offered in connection with it can be obtained from the Secretary; applications for forms of entry, &c., must be sent in between May 2nd and May 15th, and the designs entered are to be forwarded between June 20th and June 22nd.

# Our Personal Column.

**Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements.**

Councillor J. A. FORDE, engineer and manager of the Isle of Thanet Electric Supply Co., has been elected vice-chairman of the Broadstairs and St. Peter's Urban Council.

On April 16th Mr. A. M. DALLEN, assistant secretary of the Woking Electric Supply Co., Ltd., was married to Miss KATHLEEN JOSE, of Woking.

MR. S. H. PENNING, deputy borough electrical engineer at Woolwich, who has completed 25 years' service with the Corporation, has been presented by the staff with an armchair and a nest of tables.

The Heckmondwike Urban Council has increased the salary of the electrical engineer, Mr. WILLIAM PARRETT, from £330 to £350 per annum.

At the annual spring meeting of the Executive Committee, Mr. CLYDE L. CHAMBLIN, of San Francisco, was elected president of the Association of Electragists, International, for a two-year term.

The Marlborough Town Council has decided to pay an inclusive salary of £60 a year to Mr. R. J. RANCE for his services as electrical engineer. Mr. Rance is in charge of the installation at the College, from which electricity is supplied.

At a recent meeting of the South-East Lancashire Electricity Advisory Board, Alderman W. T. DAGNALL (Manchester) was appointed chairman for the ensuing year in the place of Alderman W. Walker, who has joined the Central Electricity Board. Mr. C. D. TAITE (Lancashire Electric Power Co.) was appointed vice-chairman.

Mr. J. CHRISTIE, of Brighton, sailed for New York on Saturday last by the *Mauretania*.

Mr. G. H. LOCK, of the electrical engineering department of Plymouth Technical College, has been married to Miss WINIFRED RUSSELL.

According to a South African contemporary, Mr. W. B. PHELP, managing director of the British General Electric Co., Ltd., in South Africa, left Cape Town a few weeks ago on a visit to England.

**Obituary.**—CAPTAIN REGINALD JOHN WALLIS-JONES, O.B.E., T.D.—It was with deep regret that we announced last week the death of Capt. R. J. Wallis-Jones, which took place on April 16th at the Hospital of St. John and St. Elizabeth, London, after a long illness. Capt. Wallis-Jones, who was 64 years old, was educated at Finsbury, at the Central Technical College, and at King's College, London, and commenced his career with the American Brush Corporation and the Brush Electric Light Co. Subsequently he became an installation engineer with Woodhouse & Rawson, and later, as chief electrical assistant to Kincaid, Waller and Manville, he supervised the erection of several electricity works and the construction of the Birmingham-Bournbrook electric tramway.

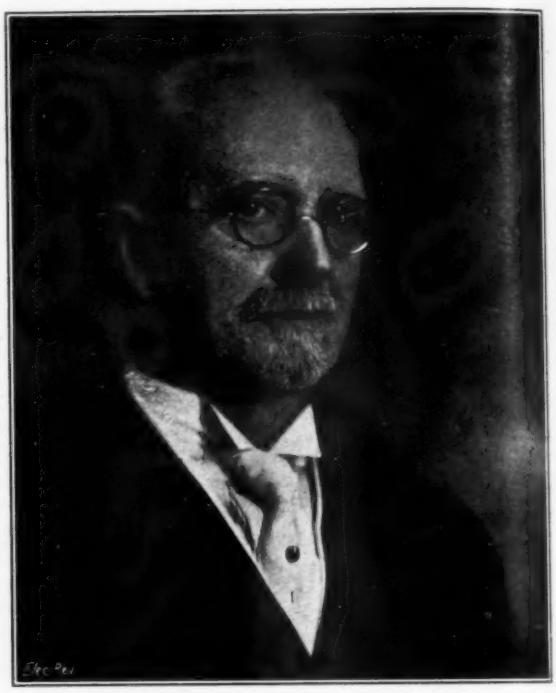
In 1900, in partnership with Mr. M. C. Dent, he commenced practice as consulting engineer and carried out a number of important installations in London and the provinces. As engineer and manager of the Electric Welding Co., Capt. Wallis-Jones did much to promote the develop-

ment of the Thomson system, and lectured on electric welding at Faraday House for some years.

An ardent supporter of the Territorial Force, Capt. Wallis-Jones was awarded the Territorial Decoration, and he served with the 1/4th Welsh Brigade R.A. in France until he was invalided home; afterwards he became the Controller of Foreign Iron and Steel at the Ministry of Munitions, receiving the O.B.E. His amiable disposition and attractive personality endeared him to a wide circle of friends, and he devoted much time to the work of social and charitable organisations; he was a Member of the Institutions of Civil and Electrical Engineers. He leaves a widow and one daughter.

The funeral took place at Hampstead Parish Church on Wednesday, April 20th. In addition to the members of the family, we noticed amongst those present Sir Edward Manville, M.P., Mr. Ll. B. Atkinson, Mr. Frank Gill. Col. C. B. Clay, Mr. J. E. Kingsbury, Mr. Moss, Mr. G. Scott Ram, Mr. P. F. Rowell (secretary, I.E.E.), Mr. H. M. Sayers, Mr. H. W. Couzens, and Mr. W. J. Tennant.

Mr. T. D. Lockwood.—We learn with very deep regret of the death, on the 5th inst., of that pioneer of telephone pioneers, Mr. Thomas Dixon Lockwood. He was born at Birmingham on December 30th, 1848. His schooldays ended with his eighth year; his education only ended with his death. At eleven years of age he began to work for a living, and he has described himself as "a fairly good machinist by 1865," when his father and family emigrated to Canada. From there T. D. Lockwood went to the United States, taking up any employment which offered. He was successively engaged in making paper in Massachusetts, plate glass in Indiana, and teaching school in Arkansas. By 1871 he had become connected with railway service as telegrapher, ticket clerk, signal operator and engineer on trains. In 1875 his connection with telegraphy became rather more stabilised, first in a private fire alarm system, and later with the Gold and Stock and American District Telegraph Companies. The telephone naturally came within his ken. He began to study and experiment with the telephone in 1878, and in 1879 sought for and obtained a position in the Bell Company with the title of assistant general inspector. In that capacity he undertook much technical work and opened a number of exchanges, but in those early days of the telephone's life the establishment on a firm basis of the Bell patent was of vital importance, and it is easy to realise how the commercial managers turned for assistance to the one man on the staff who had the necessary technical knowledge. Mr. Lockwood's adaptability and practical common sense enabled him to translate scientific definitions into everyday language and convey to Counsel and Court the real meanings of obscure phrases. His success in the company's patent work in these early days led to his being called upon to organise and take charge of a bureau of patents and technical information. This he undertook, though he had no previous knowledge of patent practice or patent law. In 1911 he was appointed general patent attorney to the American Telephone & Telegraph Company, retiring from active work in 1918, when he became their consulting patent attorney. Though mainly engaged in patent work and historical investigations, Mr. Lockwood continued for many years to take an active part in the practical features of telephony and has left his mark upon most of the developments of the earlier years. He was a frequent contributor to the electrical Press of the United States and the author of a number of technical works, including "Practical Information for Telephonists" (1882) and "Hand Book of Electric Telegraphy" (1883). His writings are characterised by clearness, vigour, and precision. His retentive memory and his first-hand knowledge of the telephone from its very first commercial beginnings, ensured a prompt and accurate reply to any question which might be put to him. His loss will be felt amongst a wide circle, and most keenly amongst his personal friends. Mr. Lockwood was a Charter member of the American Institute of Electrical Engineers, and



**The late Mr. T. D. Lockwood.**

had served as vice-president and one of the Board of Management of that body. He had been a member of our own Institution of Electrical Engineers since 1880.

Mr. C. Canham.—The death has taken place, at the age of 77 years, of Mr. Charles Canham, who for 40 years was engaged at the works of Crompton & Co., of Chelmsford, and for most of that period in the lamp shop.

Alderman W. Walker.—Alderman William Walker, chairman of Messrs. H. A. Davie, Ltd., electrical engineers, Sunderland, died on Saturday last at the age of 62 years. He was an ex-Mayor of the Wearside borough.

Mr. A. N. Dickson.—*World-Radio* records the death of Mr. A. N. Dickson, formerly of Nottingham, director of the Capetown Broadcasting Station.

# Financial Section.

**New Companies, Returns of Share Capital, Debenture Changes, Reports of Electrical Companies. Dividend Results, Transactions in Stocks and Shares.**

## New Companies Registered.

**Johnson & Tanner, Ltd.**—Private company. Registered April 16th. Capital, £2,000 in 20,000 ordinary shares of 1s. and 1,000 preference shares of £1 each. To acquire the business of electrical and mechanical engineers carried on by F. Johnson and J. J. Tanner, at 2, Park Terrace, Worcester Park, Surrey. The first directors are:—F. Johnson, "Acadia," Donnington Road, Worcester Park, Surrey, electrical engineer; J. J. Tanner, 207, Hampton Road, Twickenham, electrical engineer (who shall be joint managing directors for 10 years). Remuneration as fixed by the company. Registered office, 2, Park Terrace, Worcester Park, Surrey.

**Gorford Bros., Ltd.**—Private company. Registered April 14th. Capital, £4,500 in 10,000 founders' shares of 1s. each and 1,000 7½ per cent. cumulative preference and 3,000 ordinary shares of £1 each. Objects:—To acquire the business of engineers and contractors carried on by L. G. Davies and D. A. Davies at Station Buildings, Wealdstone, Middlesex, and to carry on the business of an electric light company in all its branches. The directors are:—L. G. Davies and D. A. Davies, Station Buildings, Wealdstone. Qualification (except permanent directors), 50 shares. Solicitor: H. E. Robertson, Oakfield Corner, Amersham, Bucks. Registered office; Station Buildings, Wealdstone.

**Porn & Dunwoody, Ltd.**—Private company. Registered April 14th. Capital, £10,000 in 6,000 8 per cent. cumulative preference shares of £1 each and 40,000 ordinary shares of 2s. each. Objects:—To adopt an agreement with Marcel Porn and to carry on the business of mechanical, electrical and

consulting engineers as formerly carried on by him at 72, Fleet Street, E.C. The permanent directors are:—M. Porn, 31, Lancaster Road, N.W.3, engineer (managing director and chairman); T. A. Dunwoody, 103, Foxley Lane, Purley, merchant. Solicitors: Woodbridge & Sons, 5, Serjeant's Inn, E.C.4. Registered office: 72-78, Fleet Street, E.C.4.

**Canadian Porcelain Co. (British), Ltd.**—Private company. Registered April 22nd. Capital, £500 in £1 shares. Objects: To acquire the sole agency in the United Kingdom for the sale of products of the Canadian Porcelain Co., Ltd. (registered and carrying on business in Canada) and to carry on the business of manufacturers, importers and exporters of porcelain, glass, metals, and similar substances; electrical and mechanical engineers, &c. The provisional directors are:—G. M. Duncan, Embassy Court, 91, Jermyn Street, S.W.1, sales manager; H. J. Wallis, 17, Victoria Street, S.W.1, solicitor's clerk.

**Lectro Linx, Ltd.**—Private company. Registered April 22nd. Capital, £5,000 in £1 shares. Objects: To acquire from A. E. Chapman, C. R. Cook, and Mrs. E. A. M. Cook, or any of such persons, the benefit of certain existing inventions relating to electrical contact terminals, couplings, wire attachments, and the like, &c. The directors are:—Mrs. E. A. M. Cook (chairman), address not stated; C. R. Cook, 61, Acacia Road, St. John's Wood, N.W.; I. B. Felton, 11F, Hogarth Road, S.W.5. Qualification, 50 shares. Secretary (*pro tem.*): J. G. Martin, 7, Philpot Lane, E.C. Solicitors: Martin & Haslett, 7, Philpot Lane, E.C.

**Langs (Wimbledon), Ltd.**—Private company. Registered April 22nd. Capital, £1,000 in £1 shares. Objects: To carry on the business of electrical engineers, manufacturers, factors, and vendors of and dealers in all kinds of wireless and electrical apparatus and goods, &c. The subscribers (each with one share) are:—A. E. Bonner, 65, Weston Park, Crouch End, N.8, clerk; H. R. Fisher, 42, Foxham Road, Tufnell Park, N.19, clerk. Qualification, £25. Remuneration, £50 each per annum (chairman £75). Solicitors: Tucker & Co., 40, Finsbury Square, E.C. Registered office: 15, Kingston Road, Wimbledon, S.W.

# Official Returns of Electrical Companies.

**Central Electric Development Co., Ltd.**—Return dated January 14th, 1927. Capital at date of return, £1,500 in ordinary shares of £1 (increased February 3rd, 1927, to £2,000 in 500 preference and 1,500 ordinary shares of £1 each). 1,500 ordinary shares taken up. £1,400 paid. £100 considered as paid. Mortgages and charges, nil. Return of allotments, made up to February 28th, 1927, shows a further 160 preference shares allotted for cash and fully called up.

**Horley and District Electricity Supply Co., Ltd.**—Capital, £20,000 in £1 shares. Return dated December 31st, 1926 (filed March 7th, 1927). All shares taken up. £10,262 paid. £2,000 considered as paid. £7,738 in arrears. Mortgages and charges at date of return, nil. Since registered: Series of £2,500 debentures (part of £5,000 authorised) issued January 28th, 1927.

Issue on April 9th, 1927, of £2,500 debentures, part of a series already registered.

**Kingsmill Art Metal and Electrical Co., Ltd.**—Capital, £5,000 in £1 shares. Return dated December 7th, 1926. 4,502 shares taken up. £2 paid. £4,500 considered as paid. Mortgages and charges, £515.

**Strange & Sons Electrical Engineering Co., Ltd.**—Capital, £200 in £1 shares. Return dated December 31st, 1926 (filed February 3rd, 1927). 32 shares taken up. £32 paid. Mortgages and charges, nil.

**Permac, Ltd.**—Capital, £100 in 1s. shares. Return dated December 31st, 1926 (filed March 22nd, 1927). All shares taken up. £100 paid. Mortgages and charges, nil.

**Norton Wireless Co., Ltd.**—Debenture dated March 14th, 1927, to secure £1,000, charged on the company's property, present and future, including uncalled capital. Holder: Matilda Parks, 65, Douglas Street, Deptford, S.E.

**Charles White Electrical Co., Ltd.**—Capital, £3,000 in 2,000 "A" and 1,000 "B" shares of £1 each. Return dated December 17th, 1926. 1,550 "A" and 1,000 "B" shares taken up. £1,050 paid, £1,500 considered as paid. Mortgages and charges, nil.

**Belshaw & Co., Ltd.**—Capital, £3,000 in 2,500 7 per cent. preference and 500 ordinary shares of £1 each. Return dated July 30th, 1926 (filed March 15th, 1927). 2,000 preference and 500 ordinary shares taken up. £2,500 considered as paid. Mortgages and charges, nil.

**Wireless Lights Syndicate, Ltd.**—Capital, £10,500 in 10,000 ordinary shares of £1 each and 10,000 deferred shares of 1s. each. Return dated December 30th, 1926. 10,000 ordinary and 5,000 deferred shares taken up. £10,000 paid on the ordinary shares. £250 considered as paid on the deferred shares. Mortgages and charges, nil.

**Ernest F. Moy, Ltd.**—Particulars filed of £7,500 debentures authorised by resolutions of December 8th and 21st, 1926, and covered by trust deed dated April 5th, 1927, charged on certain leasehold properties in Camden Town and St. Pancras and on the company's other assets, present and future, including uncalled capital, the amount of the present issue being £6,000. Trustees: C. G. Fox, 76, West Hill, Highgate, and P. H. Bastie, 7, Coniston Road, Muswell Hill, N.

**West Wilts Electric Light and Power Co., Ltd.**—Capital, £35,000 in 2,000 preference shares of £5 each and 25,000 ordinary shares of £1 each. Return dated December 7th, 1926 (filed March 17th, 1927). 1,700 preference and 21,821 ordinary shares taken up. £30,321 paid. Mortgages and charges, nil.

**Correcta Light Co., Ltd.**—Capital, £7,000 in 6,500 preference shares of £1 each and 10,000 ordinary shares of 1s. each. Return dated February 25th, 1927. 3,450 preference and 10,000 ordinary shares taken up. £2,453 paid on 2,453 preference shares. £1,497 considered as paid on 997 preference and 10,000 ordinary shares. Mortgages and charges, nil.

**Mawdsleys, Ltd.**—Capital, £20,000 in 13s. 4d. shares. Return dated November 15th, 1926. 26,500 shares taken up. £9,666 13s. 4d. paid, £8,000 considered as paid. Mortgages and charges, £7,000.

**Brecknell, Munro & Rogers, Ltd.**—Capital, £150,000 in 2,200 preference shares of £5 each, and 278,000 ordinary shares of 10s. each. Return dated January 27th, 1927. 2,058 preference and 174,829 ordinary shares taken up. £90,673 10s. paid (being £5 per share on 2,058 preference and 10s. per share on 160,767 ordinary shares), £7,031 considered as paid on 14,062 ordinary shares. Mortgages and charges, nil.

**Robert W. Blackwell & Co., Ltd.**—Capital, £50,000 in £1 shares. Return dated January 12th, 1927. All shares taken up. £18,338 paid, £31,662 considered as paid. Mortgages and charges: £14,000.

**Wardle Engineering Co., Ltd.**—Capital, £25,000 in 10,000 preference and 15,000 ordinary shares of £1 each. Return dated December 21st, 1926. 5,765 preference and 7,306 ordinary shares taken up. £12,971 paid, £200 considered as paid. Mortgages and charges: £4,000.

**C. F. Elwell, Ltd.**—A. C. Lucas, of 167, Strand, W.C., ceased to act as receiver and manager on April 1st, 1927.

**Woking Electric Supply Co., Ltd.**—Issue on April 11th, 1927, of £40,000 debentures, part of a series already registered.

# City Notes.

### Prospectus.

*Baird Television Development Co., Ltd.*—This company came before the public on Monday last with an issue of 100,000 10 per cent. preferred participating ordinary shares of £1 each and 100,000 deferred ordinary shares of 1s. each, each of the former shares carrying the right to take one of the latter. The full particulars of the company were given in our "New Companies Registered" column, April 8th, p. 568, to which we refer our readers. The list of applications was to close on or before Wednesday last, April 27th, so that any comment here will have less influence than might otherwise have been the case. It may be stated, however, that the company, which has been formed particularly "to develop commercially" the Baird Television and other inventions, acquires the sole right to "exploit" the Baird inventions for Television, invisible ray, speaking films, and other purposes in the United Kingdom of Great Britain and Northern Ireland, the English Channel Islands, the Isle of Man, and the Irish Free State, and a 66⅔ per cent. interest in the net proceeds arising from and payable to Television, Ltd., in respect of the sale and exploitation of the Foreign and Colonial rights. The prospectus refers to the demonstrations that have been given of the invention, its possible uses, and a statement of estimated revenue and profits. Mr. J. L. Baird, the inventor, will be chief technical consultant and a joint managing director for a period of five years, and Mr. O. G. Hutchinson, who has been associated with him in his work, will be a joint managing director for a like period. The purchase price is £20,000 payable to Television, Ltd., by the allotment of the remaining 400,000 deferred shares (1s.) in the new company. After paying all preliminary expenses, the net proceeds of the issue will be approximately £89,500. The vendor company is taking no cash payment, and it has underwritten 32,000 of the ordinary shares. We need say little about the issue itself owing to the closing date, and it is obvious to every reader of the REVIEW that it is an investment of the most speculative and uncertain kind and one which, in our opinion, is made quite prematurely. Whilst, as our pages have shown, progress has been made towards attaining ultimate success, the work is still in the experimental stage, and no particulars have yet been published with regard to the construction of the light-sensitive cell which is the essential feature of the system.

Since the above was written, it has been announced that the list of applications was closed on Monday.

### Shropshire, Worcestershire and Staffordshire Electric Power Co.

The net receipts for the past year amounted to £232,170, as compared with £218,066 for 1925. After deducting expenses, debenture interest, &c., and adding £50,615 brought forward, there is a sum of £144,969 available (against £140,286). It is proposed to distribute this as follows:—To reserve, £50,000; 6 per cent. preference dividend, £21,000; dividend of 8 per cent. on the "A" ordinary shares, £4,000; dividend of 7 per cent. on the "B" ordinary shares, £24,500; carried forward, £45,469. The Bill providing for the merger of the separate and general undertakings of the company has received the Royal Assent, and the report includes an amalgamated balance sheet. The reserve now totals £341,948, and the aggregate capital expenditure amounts to £2,368,148, the expenditure during the past year being £398,483. Investments in allied companies at cost stand at £114,805, and Government securities at £71,145. To provide capital for the development of the business issues of 50,000 6 per cent. cumulative preference shares, 10,685 "A" ordinary shares, and 192,137 "B" ordinary shares, all of £1 each, were made, at a net premium of £3,774, which has been written off the commission, &c., on capital issues. Supplies by overhead lines have now been made available in Evesham, Droitwich, Astwood Bank, and many smaller towns and villages. The Avon Valley Special Order, authorising the company to supply electricity in parts of Gloucestershire and Warwickshire, has been confirmed. The company has acquired the share capital of the Ludlow Electric Light Co., Ltd., and is applying for an order enabling it to supply electricity in the borough. The chief local offices are being moved from Smethwick to Halesowen. **Meeting:** May 3rd.

### Companies Struck off the Register.

The names of the undermentioned companies have been struck off the register, and such companies are thereby dissolved:—

Atmospheric Nitrates (Kilburn Scott Patents), Ltd.
Blackpool and Garstang Electric Light Railway Co., Ltd.
Bovey Light & Power Co., Ltd.
Clar-O-Phon Radio Co., Ltd.
Electric Lamp & Bulb Co., Ltd.
Electroscopes, Ltd.
High Temperature Generators (1918), Ltd.
Horsa Electrical Contracting Co., Ltd.
Ivor Electrical Co., Ltd.
Mayfair Light & Power Co., Ltd.
National Conduit & Cable Co., Ltd.
Phillips' Commutator Grinder Co., Ltd.
Pneumatic & Electric Syndicate, Ltd.
Sceando Lamp Co., Ltd.
Searchlight Projectors, Ltd.
Southport Electrical Supply Co., Ltd.
Tubeless Rapid Steam Generator Co., Ltd.

### Companies to be Struck off the Register.

At the expiration of three months the names of the undermentioned companies will be struck off the register, unless cause is shown to the contrary:—

Britannic Electrical Co., Ltd.
Enamelled Wires, Ltd.
Froggatt's Electric Lighting Co., Ltd.
Goodall Electric, Ltd.
Grasse & Cannes Electric Syndicate, Ltd.
New Process Electric Lamp Co., Ltd.

### Northern General Transport Co., Ltd.

Mr. R. J. Howley, C.B.E., presided at the annual meeting on April 21st, and in presenting the report (*vide* our last issue, p. 650) said that the past year had been the most difficult one in the history of the company. Although, when the mines were reopened, traffic receipts had begun to improve, they were still far from normal. The receipts from investments were lower owing to the passing of the ordinary dividend by the Jarrow Company and the reduction of the Tynemouth Company's dividend from 10 to 5 per cent. An issue of £118,750 ordinary shares was made during the year; the proceeds were devoted to loan repayment, improvements, and working capital. Owing to the opposition of the shareholders of the Sunderland District Transport Co., the proposal to take over that company's omnibus assets and goodwill had not gone through. Competition was still acute, and the company had to bear heavy licence fees; the chairman deprecated the raiding of the Road Fund to balance the Budget.

### National Electric Construction Co., Ltd.

The directors report a profit of £22,467 for the past year, and the balance, after providing for debenture interest, depreciation, &c., is £16,991; to this is added £5,390 brought forward, making £22,381. It is proposed to transfer £1,000 to reserve and renewals account (Dewsbury and Ossett tramways), £3,000 to dividend-equalisation reserve, and £6,000 to general reserve. After paying a dividend of 10 per cent., as for 1925, a balance of £5,581 is carried forward. The tramways in mining and industrial districts in which the company is interested suffered severely during the past year, and this will affect the dividends received on investments in the current year.

### City Electric Light Co., Ltd. (Brisbane).

The report and balance-sheet for the year ended January 31st, 1927, shows that after making addition to the franchise and purchase sinking fund, renewal, replacement and contingencies account, and the employés' provident fund, there remains a credit balance of £115,712, which, with the balance brought forward from last year, makes a sum of £115,764. Out of this sum was paid an interim dividend in September last, amounting to £57,069, and a final dividend of 5 per cent. on the ordinary shares in proportion to the amount paid thereon, free of State income tax, was recommended, leaving a balance of £50 to be carried forward. The report records the death of Mr. William John Young, a pioneer of the company, and a director since its inception.

### Marconi International Marine Communication Co., Ltd.

The accounts for the year ended December 31st last show total receipts of £990,865, as compared with £995,522 in 1925. The net profit, however, increased from £118,979 to £126,132, in spite of the fact that 1925 was an abnormal year owing to the compulsory fitting of ships' lifeboats with wireless, practically all of which was done in that year. The result is therefore considered gratifying. The company suffered loss of revenue on account of strikes, but now that normal conditions have returned orders for equipment show an increase. The shipowners agreed to pay increased amounts to the company on account of the award of higher wages to wireless operators by the Industrial Court. During the past year working arrangements were entered into with the Radio Communication Co., Ltd., and working costs have thereby been substantially reduced. The directors have set aside £20,000 from the profits to meet obsolescence of plant, and propose to pay a final dividend of 5 per cent., making 8¾ per cent. for the year, as against 7½ per cent.for 1925; £18,038 is carried forward. Mr. J. F. O'Malley has been appointed to the board. **Meeting:** May 5th.

### Indo-European Telegraph Co., Ltd.

The report for 1926 states that only two serious interruptions, caused by severe weather, occurred during the year, apart from a stoppage due to a strike of Russian employés. The revenue from all sources increased from £310,345 to £314,007. The profit, after meeting income tax, was £103,125, and a net balance of £16,288 brought forward makes available £119,413. £45,000 is devoted to writing down expenditure upon line reconstruction in Russia and Poland, and £5,244 in writing down the cost of the Persian section, and £15,000 is handed over to the retirement trust fund. A final dividend of £1 2s. 6d. per share is to be paid (making 7 per cent. for the year), together with a bonus of 15s. per share, all free of tax, leaving a balance of £11,669 to be carried forward. The meeting was to be held yesterday (Thursday).

### Llandudno and Colwyn Bay Electric Railway, Ltd.

The accounts just published cover the thirteen months to December 31st last, and show a loss of £1,427, against which is placed a surplus of £362 brought forward, leaving a net loss of £1,065. The report states that the results were seriously affected by the permanent-way expenses, high power costs, and legal expenses. Complaint is also made of the adverse effects of motor-omnibus competition. The company secured modification of the Colwyn Bay Council's Bill which sought powers to run motor-omnibuses in the district. Negotiations are in hand with regard to power supply. The company has not yet issued any of the new £100,000 6 per cent. prior lien debenture stock; the more pressing requirements were met by means of a loan of £10,000. The overhead equipment is being completely renewed from Llandudno to Colwyn Bay, and other improvements are under consideration.

### Barcelona Traction, Light and Power Co.

Further progress is recorded by this company in the accounts for the past year. The gross revenue was over $4,000,000, and, after meeting all expenses, the net result is a profit of $1,783,882, as compared with $1,248,095 for the previous year. The balance has been applied in paying four quarterly dividends at the rate of 1¾ per cent. on the preference shares, making 7 per cent., and absorbing $1,729,509, leaving a surplus of $54,372, which, together with the amount brought forward, gives a balance of $214,695 to be carried forward.

### Vickers, Ltd.

The profit for the past year was £562,284, and a balance of £190,775 is added, making £753,059. After meeting the preference dividends and transferring £200,000 to reserve, it is proposed to carry forward a balance of £134,868; no ordinary dividend is recommended. The result, in view of the dislocation of trade, is considered satisfactory; if conditions had been normal it would have been possible to pay an ordinary dividend. During the year the business was reorganised, and considerable economies were effected. Mr. G. G. Sim, C.S.I., C.I.E., has been appointed secretary, and Mr. F. C. Yapp a member of the Armaments and Shipbuilding Management Board, and Messrs. A. Williamson and G. Vickers have been elected special directors. Mr. V. C. Vickers has resigned from the board.

### Johnson & Phillips, Ltd.

The directors' report for the past year shows that after charging £15,454 for maintenance, providing for bad debts, &c., the balance at the credit of the profit and loss account is £115,114, as compared with £209,897 in 1925 (after allocating £21,000 to maintenance). To this is added £152,133 brought forward, less £60,000 paid in dividends in May last, making £207,247. From this are deducted directors' fees, &c., debenture interest, debenture sinking fund reserve, income tax, and depreciation of machinery and plant, and an interim dividend of 5 per cent., leaving £127,475. It is proposed to pay a final dividend of 7½ per cent. on the ordinary shares, making 12½ per cent. for the year, as compared with 17½ per cent. for 1925, leaving £82,475 (against £92,133) to be carried forward. The 100,000 new ordinary shares receive their first full year's dividend. The balance sheet shows a capital expenditure of £94,089 during the year, and also includes among the investments a £50,000 8 per cent. debenture in Burndept Wireless, Ltd. Meeting: May 5th.

### Calcutta Tramways Co., Ltd.

The total revenue for the past year was £132,723, as against £219,044 for 1925. The addition of £37,703 brought forward makes available £170,426. It is proposed to place £70,000 to depreciation reserve and £2,164 to staff provident fund, and, after paying a dividend of 5 per cent., free of tax (against 7½ per cent.) on the ordinary shares, to carry forward £12,410. The decrease in revenue is attributed to the recurrent communal riots in Calcutta and to the growing competition of independent omnibus owners. To meet the competition the company lowered its fares and the increased traffic is expected to compensate for the reduction. Meeting: May 3rd.

### Rangoon Electric Tramway and Supply Co., Ltd.

From the profits of the past year £50,000 is transferred to renewals reserve, £30,000 to cables reserve, £5,000 to fire-insurance reserve, and £10,000 to the low-pressure conversion reserve, leaving a net balance of £60,824, as compared with £47,983 for 1925. An interim dividend of 8 annas per share was paid on the old ordinary shares, and it is proposed to pay a further Rs.1.4 annas per share on these and 14 annas per share on the new ordinary shares, leaving £25,573. The 100,000 new £1 ordinary shares were issued in August last at Rs.16 per share.

### International General Electric Co.

The company's report for 1926 shows a net income from sales of $806,753, and a net "sundry" income of $731,554, totalling $1,538,307. The dividends—7 per cent. on the preferred stock and 8 per cent. on the common stock—absorb $1,500,000, and the balance is transferred to surplus, making $11,898,577. The value of orders received fell from $25,710,000 in 1925 to $20,824,000 in 1926, and the value of orders in hand at the end of the year from $9,645,000 to $8,112,000.

### Thames Valley Traction Co., Ltd.

The profit for 1926, after providing for all charges, including depreciation and reserve, is £11,120 (against £5,049), to which is added £3,088 brought forward, making £14,208. It is proposed to pay a dividend of 10 per cent. on the ordinary shares (against 6 per cent.), leaving £6,399 to be carried forward. During the year the authorised capital was raised from £75,000 to £100,000, and 5,000 new shares were issued.

### Electrical Finance and Securities Co., Ltd.

After meeting debenture interest, fees and expenses, the credit balance for 1926 is £6,647, and the addition of £2,408 brought forward makes available £9,055. A dividend of 10 per cent. is recommended, leaving £2,962 to be carried forward.

### Mexborough and Swinton Tramways Co.

After providing for taxation, depreciation, loss on motor-'buses, &c., there is a deficit of £353 on the 1926 net revenue account. Against this is placed £1,460 brought forward, and the balance is carried to the next account. No dividend can be paid on the ordinary shares; in the preceding year they received 2 per cent., free of tax.

### Howard & Bullough, Ltd.

The recently-issued accounts cover the ten months to March 31st last, and show a profit of £41,927, plus £159,947 brought forward, making £201,874. The final ordinary dividend is at the rate of 10 per cent. per annum for four months, making 6⅔ per cent. for the period, as against 10 per cent. for 1925-26, i.e., the same rate.

### Philips Lamps.

According to the *Financial Times*, Philips Incandescent Lamp Factories has issued a dividend of 16 per cent. on the ordinary shares for 1926 and one of 8 per cent. on the preferred shares.

### Montevideo Telephone Co.

The directors of the Montevideo Telephone Co. have declared an interim dividend on the ordinary shares at the rate of 6 per cent. per annum, free of tax, payable on May 2nd.

### Hopkinsons, Ltd.

The report for the year ended January 31st last is the first since the company's incorporation. A net profit of £72,283 is shown, and of this £11,347 representing profit earned prior to incorporation is transferred to capital account. A final dividend of 5 per cent. (making 10 per cent. for the year) is to be paid on the ordinary shares and £12,224 is carried forward.

At the first ordinary general meeting, Mr. Robert A. Hopkinson, chairman, commented on the strong financial position of the company. He said that the payments of the dividends had been arranged to fall at three-month intervals, *viz.*, preference, January 31st; final ordinary, April 30th; preference, July 31st; and interim ordinary (if any), October 31st. During the past year £25,058 had been spent on new buildings and plant. Included in the extensive development work which had been carried out by the company were the experiments made in connection with the electrical operation of valves from a distance. Considerable attention had also been given to the development of thermostatic valves for controlling the temperature of liquids. The manufacture of feed-water regulators was a new activity of the firm. At the end of 1926 arrangements had been made for the transfer of the business to the new company, and in nearly every case where shares of the old company were held by employés, they were converted to shares in the new company. The report and accounts were unanimously adopted.

### Calcutta Electric Supply Corporation, Ltd.

The directors recommend a final dividend of 7 per cent. actual, making a total of 12 per cent. for the year. They also recommend a distribution of bonus shares in the ratio of one new ordinary share for every 10 of the existing ordinary shares. Meeting: May 4th.

### Stock Exchange Notice.

Application has been made to the Committee to allow the following to be officially quoted:—

American Telephone and Telegraph Company.—$13,639,500 capital stock.

### Western Union Telegraph Co.

The gross revenues for the quarter ended March 31st last amounted to $32,241,077, as compared with $32,705,184 in January-March, 1925. The net income fell from $3,415,646 to $3,236,223.

### Associated Gas and Electric System.

The earnings during the year ended February 28th increased by $7,500,115 to $30,131,629. The net earnings rose from $9,135,820 to $13,617,033.

### Consolidated Gas, Electric Light and Power of Baltimore.

A dividend of $¾ per common share has been declared in respect of the quarter ending June 30th.

# Stocks and Shares.

MONDAY EVENING.

THANKS to the unexpected reduction to 4½ per cent. in the Bank rate, stock markets have taken on a very cheerful aspect. That monetary conditions would have to become easier in order to allow the Government to exercise substantial economies, was fairly obvious by a close reading of the Budget speech. City opinion regarded a change in the Bank rate as being dependent upon developments in China, and, these not being favourable, the fall last Thursday in the rate came as a surprise. A very pleasant surprise, too, and one that is hailed as the herald to a further decline to 4 per cent. in the fairly near future.

The immediate effect was to put up prices of all investment stocks and shares. Gilt-edged issues led the way, and were promptly followed by such sound industrials as those, for instance, in the cable group. The relief that will be afforded to trade and industry is reflected in the improved values for shares in iron, steel, and other "heavy" companies. Vickers' report, showing an increased profit—the ordinary shares still go dividendless—came at an opportune moment to fan the revival of hopefulness that is noticeable in regard to such industrials. Home Railway stocks were disposed at first to hang back in the advance which affected most of the other markets, but later on, they came into line with the rest

The Underground Railway stocks and shares were taken in hand by their supporters, and Districts rose to 60½. Expectations of record crowds at the Cup Final last Saturday were supplemented by consideration of the fact that the time is close at hand when traffics will run against those of the General Strike fortnight. The strike started last year at midnight on Monday, May 3rd. The Metropolitan, true to its traditions, was the first line to re-open, which it did (with a very skeleton service) on the Wednesday in the same week. The District and the Tubes "got going" two days later. On Wednesday, May 12th, the strike was declared at an end, but this turned out to be premature, and not until Monday, the 17th, did con-

ditions approach normality. For many weeks afterwards, coal became worse in quality and dearer in price. The District, alone amongst the railway companies, earned the 3½ per cent. dividend which it paid for 1926, and this is the reason why the stock is chosen by the speculative investor of to-day. The Underground Electric Railways of London succeeded in entering the dividend-list with 1½ per cent. on the reorganised share capital, and, since then, the £1 shares have made steady upward progress week by week, standing now at 17s. 6d.

It is interesting to observe a gain of 7½ points in British Electric Traction stock. This brings the price to 150, comparing with 135 at the time, a few weeks ago, when attention was drawn to the "Trust" company character of the undertaking.

No little dust has been raised by the action of the Southern Railway in giving to a Swedish Company the contract for an important order whose execution will provide a good deal of work. The railway has laid especial stress upon the fact that its action was not dictated by considerations of price, although the English tenders were more expensive than the Swedish. The contract has gone abroad owing to the home firms' imposition of conditions that were not stipulated by the foreign manufacturers. In this column, we are concerned only with the financial aspect of the matter, and, in regard to that, it must be recorded that Stock Exchange opinion inclines to the view that the step taken by the Southern Railway has a good deal to be said in its favour, while regret is general at so substantial an order having been placed abroad. The effect upon share-prices is purely negative, in that no changes have occurred. Had the contract been given to British companies, the shares in the undertakings concerned would have strengthened, as a result. General Electrics and other shares in the manufacturing group are unaltered on the week.

Anglo-Argentine Trams are a good market, the second preference being 10s. higher at 76s. 3d. Rumours cluster thickly around the course of the negotiations that are said to be taking place. The 5 per cent. debenture stock has been in demand up to 73, and there is not much floating supply in the market. La Plata Trams are creeping up in price. The 6 per cent. preference, still cum 1s. 6d. dividend that will be deducted on Thursday in this week, stand at 21s. 3d., and the ordinary, in which a hand is being taken by speculators, are 4s. 6d. Mild gambling in the ordinary shares is encouraged by extremely nebulous reports as to the possibility of the company being taken over by a certain group.

Cable stocks and shares have responded to the Bank rate reduction with rises in Anglo-American preferred, Eastern ordinary, Eastern Extensions, and Western shares. Great Northerns advanced a further 5s., to 27½, on the dividend declaration. Globe preference are ½ up at 11 in sympathy with the improvement in the best-class stocks. Amongst the telephones, United River Plate are better at 8 13/16. Marconis mark time, and the Marine Company's shares remain at 23s. 9d., the dividend increase, to 8¾ per cent., having been expected, and discounted in advance. Weakness continues to characterise Automatic Telephones, in which the price has slipped back to 47s. 6d. India Rubber shares followed up last week's advance with a fresh rise to 20s. 7½d. Business in the equipment section is quiet.

A violent rise, of 4 points in one afternoon, lifted Brazilian Tractions to 141. Men in the market profess mystification at the current price of the shares, because there is little reason, on the surface, to justify the quotation. Consequently, guesses are made at what may be the explanation for this latest outburst of optimism inspired by Brussels buying. Another share to enjoy a dramatic rise is Barcelona Traction, but, in this case, the spurt from 46 to 52 has a foundation in the issue of an extremely satisfactory report. The directors go so far as to hint at the likelihood of a dividend on the common shares, and in the fairly near future. The Board seems to take a rosy view of prospects which, to the cautious eye, may still take time to materialise into dividends on the common shares. Mexican Utilities hold the gains of a week ago. Nothing has transpired, up to this (Monday) night, in the shape of news about the expected scheme for dealing with the dividend accumulation of arrears on Mexican Light & Power preferred. Meanwhile, private correspondence speaks none too comfortably concerning the state of the distressful country, where brigandage apparently still goes on in certain districts. The obvious reply is, of course, that in Mexico, there always was, and always will be, a measure of lawlessness in the outlying and mountainous parts.

Electricity supply shares are hard in tone, and a few advances have occurred. The Shropshire and Worcestershire report is a good one, the effect being to draw attention to shares in provincial companies that did poorly last year owing to the coal stoppage. It is contended that in the course of a year or two these undertakings will more than retrieve the damage inflicted upon them by the industrial conditions of 1926, and that the buyer of to-day is likely to see a handsome appreciation of prices in the future. Electric Constructions at 30s. are unaffected by repetition of last year's 10 per cent. dividend.

There is nothing much doing in the rubber share market, where only languid interest is taken in the suggestion that the Stevenson restriction scheme shall be abandoned, and that the producing companies shall revert to free selling. The exportable allowance of the rubber-producers that come under the voluntary restriction, will be reduced next week to 60 per cent., but this has led to no accession of business or of interest in the market for rubber shares.

# Share List of Electrical Companies.

| | Nom. | Dividend. 1925. | Dividend. 1926. | Price Apr. 25 1927. | Rise or fall. | Yield. p.c. |
|---|---|---|---|---|---|---|
| **Home Electricity Companies.** | | | | | | |
| Bournemouth and Poole | £1 | 14 | 14 | 69/6 | — | 4 14 1 |
| Brompton Ordinary | 1 | 10 | 8¾ | 25/6 | — | 7 5 3 |
| Charing Cross Ordinary | 1 | 15 | 8½ | 25/- | — | 5 12 0 |
| do. do. 4½ Pref. | 1 | 4½ | 4½ | 17/- | — | 5 6 0 |
| Chelsea | 1 | 12 | 8¾ | 25/- | — | 5 12 0 |
| City of London | 1 | 15 | 10 | 18⅜ | — | 5 1 10 |
| do. do. 6% Pref. | 1 | 6 | 6 | 22/6 | — | 5 6 8 |
| Clyde Valley | 1 | 8 | 8 | 31/- | — | 5 3 3 |
| County of London | 1 | 15 | 7½ | 28/- | + 6d. | 5 0 0 |
| do. do. 6% Pref. | 1 | 6 | 6 | 22/6 | — | 5 6 8 |
| Edmundson's Ordinary | 1 | 7 | 8 | 26/3 | — | 6 2 0 |
| do. 7% Pref. | 1 | 6 | 7 | 23/6 | + 6d. | 5 19 2 |
| Elec. Supply Corporation | 1 | 10 | 10 | 31/3 | — | 6 8 0 |
| Kensington Ordinary | 1 | 15 | 8 | 25/- | — | 5 12 0 |
| Lancs. Light and Power | 1 | 7½ | 7½ | 26/6 | + 1 d. | 5 13 3 |
| London Electric | 1 | 10 | 8½ | 24/- | — | 5 16 8 |
| do. do. 6% Pref. | £ | 6 | 6 | 5¾ | + 1/16 | 5 9 1 |
| Metropolitan | 1 | 11 | 8 | 28/6 | — | 4 18 3 |
| do. 4½% Pref. | 1 | 4½ | 4½ | 17/- | — | 5 2 10 |
| Midland Counties | 1 | 5½ | 6 | 22/6 | — | 5 6 8 |
| Newcastle-on-Tyne Ordinary | 1 | 7 | 5 | 22/6 | — | 4 9 0 |
| do. 5% Pref. | 1 | 5 | 5 | 17/6 | — | 5 14 3 |
| do. 7% Pref. | 1 | 7 | 7 | 24/- | — | 5 16 8 |
| Notting Hill 6% Pref. | 10 | 6 | 6 | 10 | — | 6 0 0 |
| North Met. Elec. 6% Pref. | 1 | 6 | 6 | 22/- | — | 5 9 1 |
| St. James' and Pall Mall | £ | 17½ | 8 | 25/6 | — | 5 9 10 |
| South London | 1 | 15 | 6½ | 25/- | — | 5 12 0 |
| South Metropolitan Pref. | 1 | 7 | 7 | 1¼ | — | 6 3 0 |
| Urban Ordinary | 1 | 4 | 7 | 25/6 | — | 5 9 10 |
| do. 6% Pref. | 1 | 6 | 6 | 1 1/16 | — | 5 13 0 |
| Westminster Ordinary | 1 | 15 | 8½ | 25/- | — | 5 12 0 |
| Whitehall Elec. Invst. 7½% Pref. | 1 | 7½ | 7½ | 20/3 | — | 7 8 2 |
| Yorkshire Elec. | 1 | 8 | 8 | 29/6 | — | 5 8 4 |
| **Home Rails.** | | | | | | |
| Central London Ord. Assented | Stock | 4 | 4 | 70 | — | 5 14 4 |
| Metropolitan | ,, | 5 | 3 | 63½ | — | 4 16 0 |
| do. District | ,, | 3½ | 3½ | 60½ | + 1½ | 5 15 8 |
| Underground Electric | £1 | Nil | 1½ | 17/6 | + 1/- | 1 14 3 |
| do. do. Income | Bonds | 6 | 6 | 102 | — | *5 17 6 |
| **Telegraphs and Telephones.** | | | | | | |
| Anglo-Am. Tel. Pref. | Stock | 6 | 6 | 101 | + 1 | 5 18 10 |
| do. Def. | ,, | 1½ | 1½ | 23⅝ | — | 6 6 0 |
| Automatic Telephone | 1 | 3 | 10 | 47/6 | - 1/3 | 4 4 3 |
| Chili Telephone | £ | 5 | 6 | 6 7/16 | — | 4 13 2 |
| Cuba Sub. Ord. | 10 | 5 | 5 | 7 | — | 7 2 10 |
| Eastern Extension | 10 | 10 | 10 | 17⅜ | + ¼ | *5 13 6 |
| Eastern Tel. Ord. | Stock | 10 | 10 | 174½ | + 2 | *5 14 7 |
| Globe Tel. and T. Ord. | 10 | 10 | 10 | 19½ | — | *5 8 1 |
| do. do. Pref. | 10 | 6 | 6 | 11 | + ⅛ | 5 9 1 |
| Great Northern Tel. | 10 | 20 | 20 | 27½ | + ½ | 7 5 6 |
| Indo-European | 25 | 8½ | 10 | 40½ | — | *5 7 6 |
| Marconi | 1 | Nil | Nil | 17/6 | — | . . . |
| Marconi-Marine | 1 | 7½ | 8½ | 23/9 | — | 7 7 4 |
| Oriental Telephone Ord. | 1 | 12 | 12 | 52/6 | + 6d. | *4 11 5 |
| United R. Plate Tel. | £ | 8 | 8 | 8⅛ | + ⅛ | *4 10 9 |
| Western Telegraph | 10 | 10 | 10 | 17½ | + ½ | *5 16 0 |
| **Home and Foreign Trams, &c.** | | | | | | |
| Anglo-Arg. Trams First Pref. | £ | 5½ | 5½ | 3½ | + ⅛ | 7 17 3 |
| do. do. 2nd Pref. | £ | 6 | 6 | 3 3/32 | + ⅛ | 7 17 4 |
| do. do. 5% Deb. | Stock | 5 | 5 | 71½ | — | 7 0 0 |
| British Electric Traction Ord. | ,, | 8 | — | 150 | + 7½ | 5 6 8 |
| do. do. 6% Pref. | ,, | 6 | 6 | 109 | — | 5 10 1 |
| Brazil Traction | 100 | 5 | 6 | 141 | + 3½ | 4 5 0 |
| Brit. Columbia Elec. Rly. Pcc. | Stock | 5 | 5 | 89½ | — | 5 11 9 |
| do. do. Preferred | ,, | 6½ | 6½ | 117½ | + 1 | 5 6 5 |
| do. do. Deferred | ,, | 8 | — | 158 | + 2 | *5 1 3 |
| do. do. Deb. | ,, | 4½ | 4½ | 80½ | + ½ | 5 5 7 |
| London & Sub. Trac. 5% Pref. | 1 | Nil | Nil | 7/9 | — | Nil |
| London United Tram. Deb. | Stock | 4 | 4 | 51 | — | 7 16 10 |
| Mexico Trams, 5% Bonds | — | 5 | 5 | 73½ | — | 6 16 1 |
| Mexican Light Common | 100 | Nil | Nil | 45 | — | Nil |
| do. Pref. | 100 | Nil | Nil | 107 | — | Nil |
| do. 1st Bonds | — | 5 | 5 | 68½ | — | 7 6 0 |
| Yorkshire (West Riding) | 1 | 5 | — | 8/9 | — | . . . |
| **Manufacturing Companies.** | | | | | | |
| Babcock & Wilcox | 1 | 13 | 13 | 55/- | — | *4 16 6 |
| British Aluminium Ord. | 1 | 12½ | 10 | 44/6 | — | 4 10 0 |
| British Elec. Transformer Pref. | 1 | Nil | 7 | 18/ | — | 7 9 0 |
| British Insulated Ord. | 1 | 15 | — | 70/- | — | 4 5 9 |
| Brush Ord. | 1 | 10 | — | 28/3 | — | 7 1 7 |
| Callenders | 1 | 15 | — | 3½ | — | 4 5 9 |
| do. 6½% Pref. | 1 | 6½ | 6½ | 23/9 | — | 5 9 5 |
| Crompton Ord. | 1 | Nil | Nil | 10/- | — | . . . |
| Edison-Swan | 4/- | 10 | 10 | 10/ | — | 4 0 0 |
| do. 5% Deb. | Stock | 5 | 5 | 85 | — | 5 17 8 |
| Electric Construction | 1 | 10 | 10 | 30/- | — | 6 13 4 |
| Enfield Cable Pref. | 1 | 7½ | 7½ | 1½ | — | 6 6 4 |
| English Electric | 1 | Nil | Nil | 10/- | — | . . . |
| do. do. Pref. | 1 | 8 | — | 12/6 | — | . . . |
| Gen. Elec. Pref. | 1 | 6½ | 6½ | 23/6 | — | 5 10 8 |
| do. Ord. | 1 | 7½ | — | 30/6 | — | 4 18 4 |
| Henley | 1 | 20 | — | 90/- | — | 4 8 11 |
| do. 4½% Pref. | £ | 4½ | 4½ | 4½ | — | 5 6 0 |
| India-Rubber | 1 | 5 | 5 | 1 1/32 | + 3/32 | *4 16 10 |
| Johnson & Phillips | 1 | 17½ | — | 2½ | — | 7 7 4 |
| Met.-Vickers Ord. | 1 | 8 | 8 | 37/6 | — | 5 11 4 |
| do. Pref. | 2 | 8 | 8 | 2½ | — | 6 14 9 |
| Siemens Ord. | 1 | 7½ | — | 26/9 | — | 5 12 2 |
| Telegraph Construction | 12 | 10 | 10 | 98½ | — | *4 4 2 |

* Dividends paid free of Income Tax.

# Our Foreign Electrical Trade.

## Electrical Exports and Imports during March, 1927.

THE Board of Trade returns of our foreign electrical trade during March record increased imports and smaller exports as compared with the preceding month. While, however, the rise in imports was substantial, the decrease in exports was only about 0.6 per cent. Looking at the export section, it will be observed that the increases predominated in number; most of them were small, but the rises in glow lamps, "other" motors and generators and submarine cable stand out. The second item nearly compensated for the decreases in the other two machinery sections. The increases in the exports of telegraph and telephone cables were more than offset by a drop of £46,594 in the case of insulated wires and cables. Telegraph and telephone apparatus continued the downward movement which commenced in December last. In comparison with March, 1926, the export total shows an increase of over £58,000; the individual items exhibit a number of wide variations. The machinery section improved to a satisfactory extent, but all three cable sections registered large decreases. Unenumerated electrical goods and batteries and accumulators were both well up. The figures for the first quarter show that last year's satisfactory export position is being improved upon.

The following table shows the distribution of our electrical machinery exports during March compared with the figures for the preceding March:—

| Destination. | March, 1926. £ | March, 1927. £ | Inc. or dec. £ |
|---|---|---|---|
| European countries ... ... | 55,646 | 62,951 | + 7,305 |
| Japan ... ... ... ... | 7,467 | 23,872 | +16,405 |
| South American countries... | 33,059 | 55,299 | +22,240 |
| South Africa ... ... ... | 51,842 | 92,908 | +41,066 |
| British India ... ... ... | 110,330 | 76,356 | −33,974 |
| Australia ... ... ... | 111,347 | 153,280 | +41,933 |
| New Zealand ... ... ... | 42,101 | 35,793 | − 6,308 |
| Canada ... ... ... | 17,752 | 11,071 | − 6,681 |
| Other countries ... ... | 54,869 | 66,074 | +11,205 |
| Totals ... ... | £484,413 | £577,604 | +£93,191 |

Turning to the imports, it will be noticed that only three items were lower in value than in February, and that the decreases were of a negligible size. On the other hand, there were some important increases, the chief of which occurred in the two unenumerated sections. Increases of over £10,000 also occurred in batteries and accumulators, insulated wires and cables, and meters and instruments. The comparison with the corresponding month of last year is a reflection of the preceding column, although the increases were generally smaller, and the two decreases larger; there was an increase in arc lamps and parts, where a decrease occurred in comparison with February. The first quarter's import total is well above that of the first quarter of 1926.

The dwindling tendency of re-exports continued.

| | Exports. | | | Imports. | | | Re-Exports. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Electrical exports for Mar., 1927. | Inc. or dec. as compared with Feb., 1927. | Inc. or dec. as compared with Mar., 1926. | Electrical imports for Mar., 1927. | Inc. or dec. as compared with Feb., 1927. | Inc. or dec. as compared with Mar., 1926. | Electrical re-exports for Mar., 1927. | Inc. or dec. as compared with Feb., 1927. | Inc. or dec. as compared with Mar., 1926. |
| Electrical goods and apparatus (unenumerated) ... ... | £217.036 | + £6 386 | + £25 881 | £118.002 | + £31,144 | + £29.136 | £4 419 | − £1,231 | − £2,887 |
| Insulated wires and cables ... | 260,725 | − 46.594 | − 32,144 | 63.575 | + 11.152 | + 1,054 | 517 | + 295 | − 1,457 |
| Glow lamps ... ... ... | 52 455 | + 13.542 | + 11,420 | 27 624 | + 3,063 | + 5.545 | 3,593 | + 1,502 | + 2,486 |
| Arc lamps and parts ... ... | 3,984 | + 1,189 | + 3 090 | 2,476 | − 321 | + 1,318 | 1,137 | + 1,081 | − 267 |
| Batteries and accumulators ... | 102 869 | + 1,803 | + 35,272 | 44 376 | + 10 779 | + 7,397 | 237 | − 174 | − 1,965 |
| Meters and instruments ... | 30,984 | − 4,890 | − 5,212 | 26,445 | + 10,235 | + 2,859 | 328 | − 86 | − 1,344 |
| Carbons ... ... ... | 4.402 | + 3.589 | − 3,131 | 3.993 | − 1,678 | − 4,888 | 27 | + 2 | − 161 |
| *Electrical Machinery—* | | | | | | | | | |
| Electrical machinery (unenumerated) ... ... ... | 325 482 | − 23,685 | + 52,842 | 138,728 | + 40,843 | + 21.573 | 8,785 | + 833 | − 2.973 |
| Railway and tramway motors | 38 808 | − 8,819 | − 5,466 | — | — | — | — | — | — |
| Other motors and generators .. | 213,314 | + 27.825 | + 45.815 | — | — | — | — | — | — |
| Switchboards (not telegraph or telephone) ... ... | 10.026 | + 2.355 | + 6.618 | 13 | + 4 | + 9 | 4 | + 4 | − 14 |
| *Telegraph and Telephone Cable and Material—* | | | | | | | | | |
| Telegraph and telephone wires and cable (not submarine) | 55,724 | + 10,697 | − 31,183 | 4 917 | − 255 | − 4.904 | 12 | − 227 | − 10 |
| Submarine telegraph and telephone cable... ... ... | 38,132 | + 13.641 | − 11,469 | — | — | — | — | — | — |
| Telegraph and telephone instruments and apparatus ... | 183.450 | − 16,793 | − 40,471 | 36.567 | + 1,695 | + 2,477 | 3,220 | − 2,135 | − 1,447 |
| Totals ... ... | £1,537,391 | − £9.974 | + £58,124 | £466 716 | + £106,681 | + £61,606 | £22,279 | − £136 | − £10,039 |
| Increases and decreases for three months of 1927 ... | | Exports: + £373,879 | | | Imports: + £158,491 | | | Re-Exports: − £10,614 | |

### United States Electrical Exports.

The preliminary figures of the foreign electrical trade of the United States during February, published by *Commerce Reports*, give an export total of $7,003,482, as compared with $6,967,918 in February, 1926. The largest increases occurred in the lighter classes, such as telephone apparatus, electric lamps, batteries, portable tools, and motor-driven household devices. Although the shipments of heavy machinery declined upon the whole, there were increases in some classes, including transforming and converting apparatus, d.c. generators of 500 kW and over, self-contained lighting outfits, small motors, and industrial electric furnaces and ovens. The largest decline occurred in the case of electric railway locomotives, and among other classes which experienced falls were mining and industrial locomotives, a.c. generators, 2,000 kVA and over, switches and circuit breakers, railway motors and radio apparatus.

# The Situation in Belgium.

## Foreign Electrical Trade Statistics.

MR. J. PICTON BAGGE, Commercial Secretary at the British Embassy, Brussels, has forwarded to the Department of Overseas Trade a report upon the economic situation in Belgium in 1926. (Stationery Office, 4s. 6d. net.) In this a great deal of attention is paid to the financial and monetary problems with which the country was confronted. It is shown that by heroic measures the edifice of public finance was slowly but surely set up, making a firm basis for national economic life. It was recognised that a stable exchange, and therefore industrial and commercial well-being, rested on the basis of a balance of international payments, a balance which could only be secured by intensified production and a highly-developed organisation in all branches of the export trade. A national committee on industrial production was set up, and after examining numerous aspects it published a report dealing with the country's principal industries. Among the matters treated were the organisation of the supply and distribution of electrical power, the utilisation of the country's water power, the scientific organisation of factories, standardisation and specialisation, &c. Belgian industries have already made much progress in production methods since the war. The present position of industry in general is said to be good, and in spite of the difficult conditions the results for the past year were satisfactory.

### Electric Light and Power.

The rapid development of the use of electricity continued during the past year. Hesitation upon the part of industry to proceed with the conversion of motive installations was caused by the instability of the currency, but this was compensated for by the demand from the rural districts, stimulated by a shortage of labour and the realisation of the necessity for improved methods of farming. In the province of Antwerp and in the Campine, excellent progress has been made with the electrification scheme. Of the 400 km. of cable to be laid 160 km. has already been completed, and 14 communes have been connected. Similar progress has been made in the provinces of Namur and Limburg. The report embodies a table showing the progress made by the principal electricity supply authorities. At December 31st, 1925, there were 28 power stations, with a total capacity of 630,000 kW, owned by private electric light and power companies; in addition to these the municipal plants in Brussels, Ghent and Liège had a total capacity of 45 000 kW, and a large quantity of power was produced by mining and metallurgical concerns for distribution. The supply companies' output rose from 630 million kWh in 1924 to 790 million kWh in 1925. The load dispatching system inaugurated in the Liège area is gradually extending.

Provincial administrations in provinces where no central power stations exist have decided to install h.p. circuits, with l.p. distribution, in the rural communes. In East Flanders only a few of the communes now remain without electricity, and official forecasts estimate that within five years every commune will be served. Directly electricity becomes available, local farmers install electric lighting apparatus and substitute electric motors for petrol-driven machines. Small-scale farmers are creating a demand for small motors (3 to 7 h.p.) which operate dairy and farm machinery of all descriptions. Oral and practical construction in the handling and repairing of machines is given by public authorities and agricultural associations. The increased use of electricity by the railways is also mentioned.

### The Radio Industry.

While the iron and steel industry is dealt with at great length, no mention is made of the electrical manufacturing industries, with the sole exceptions of the porcelain and radio sections. Electrical porcelain is said to be produced in quantities more than sufficient for home requirements, and a good market is found in France. With regard to the radio industry it is stated that a stagnation has been caused in the supplies trade on account of the poor financial position of the broadcasting service, which is thus unable to develop. Negotiations are in progress which, if successful, will give the broadcasting company revenue from the licence fees which at present are retained by the Government. The fees will probably be increased. At present there are only 30,000 licences issued, and listeners are largely dependent upon the British and French services, for the reception of which expensive sets are required. If the arrangement with the State is negotiated the Belgian service will be improved, with a resultant increase in the sale of sets. The report states that at present British sets are too expensive for the Belgian market, which is mainly supplied by Belgian and French manufacturers. There is, however, a good demand for British component parts, the quality of which is superior to French and German makes. Holland practically monopolises the valve market.

### Communications.

While but slight progress has been made in the internal telegraph system, cables are being laid for the international telegraph and telephone service between La Panne-Brussels and Herbesthal. Other international telephone lines under construction are those between Brussels and Roosendael and Lille. Between October 31st, 1925, and October 31st, 1926, the number of telephone exchanges rose from 367 to 382, and the number of subscribers from 119,153 and 130,398; new lines totalling 154 km. were erected. The 1927 Budget provides credits of 137 million francs for the development and improvement of the system. Amplifying stations for the Brussels-Luxemburg line are to be constructed at Jemelle and Aubange, and underground cables are to be laid in the Brussels, Antwerp and Liège areas in Flanders and in the provinces of Liège, Limburg and Luxemburg. Cables are also to be laid from Brussels to Charleroi with a branch to Mons. In August last contracts were signed between the Government and the Sociétés Radio Belgique and Goldschmidt for the use of the latter company's transmitting stations for a short-wave public radio-telegraph service which was inaugurated on August 30th. Powerful stations have been erected in the Congo. The 1927 Budget provides 145,000 fr. for the construction of the Ruysselede transmitting station, and 1,300,000 fr. for an electrical sub-station. Credits are also provided for the naval stations at Antwerp and Ostend.

## Imports and Exports in 1925 and 1926.

THE Belgian Government now publishes monthly statistics of the country's foreign trade in considerable detail, and with the publication of the December issue it is possible for the first time to survey the import and export trade in electrical machinery and apparatus during the past two years. Below are given the weights of such goods imported and exported in 1925 and 1926 with a note of any increase or decrease :—

| | 1925. Thous. kg. | 1926. Thous. kg. | Inc. or dec. Thous. kg. |
|---|---|---|---|
| **Imports.** | | | |
| *Dynamo-electric machines—* | | | |
| Total ... ... ... | 4,153 | 3,760 | − 393 |
| From France ... ... ... | 1,449 | 1,317 | − 132 |
| „ Germany ... ... ... | 826 | 865 | + 39 |
| „ Sweden ... ... ... | 700 | 465 | − 235 |
| „ United States ... ... | 65 | 303 | + 238 |
| „ Switzerland ... ... | 395 | 228 | − 167 |
| *Dry batteries—* | | | |
| Total ... ... ... | 303 | 221 | − 82 |
| From France ... ... ... | 114 | 109 | − 5 |
| „ Denmark ... ... ... | 117 | 66 | − 51 |
| *Accumulators and plates—* | | | |
| Total ... ... ... | 610 | 539 | − 71 |
| From United States ... ... | 432 | 270 | − 162 |
| „ Great Britain ... ... | 48 | 108 | + 60 |
| „ France ... ... ... | 33 | 75 | + 42 |
| „ Germany ... ... ... | 14 | 31 | + 17 |
| *Cables, submarine and underground—* | | | |
| Total ... ... ... | 1,236 | 3,312 | +2,076 |
| From Germany ... ... ... | 477 | 2,795 | +2,318 |
| „ Holland ... ... ... | 166 | 241 | + 75 |
| „ France ... ... ... | 61 | 140 | + 89 |
| *Insulated wire and cable, other—* | | | |
| Total ... ... ... | 653 | 517 | + 136 |
| From Germany ... ... ... | 386 | 245 | − 141 |
| „ France ... ... ... | 48 | 58 | + 10 |
| „ Holland ... ... ... | 66 | 96 | + 30 |
| *Carbons for electrical purposes—* | | | |
| Total ... ... ... | 239 | 369 | + 130 |
| From Germany ... ... ... | 115 | 140 | + 25 |
| „ United States ... ... | 70 | 152 | + 82 |
| *Insulators of porcelain, glass, &c.—* | | | |
| Total ... ... ... | 948 | 860 | − 88 |
| From Germany ... ... ... | 70 | 190 | + 120 |
| „ France ... ... ... | 716 | 548 | − 168 |
| *Insulating tubes, not metal covered—* | | | |
| Total ... ... ... | 19 | 36 | + 17 |
| From Germany ... ... ... | 11 | 87 | + 76 |
| „ Switzerland ... ... | 4 | 36 | + 32 |

| | 1925 Thous. kg. | 1926. Thous. kg. | Inc. or dec. Thous. kg. |
|---|---|---|---|
| *Insulating tubes, other, with junction boxes, &c.—* | | | |
| Total ... ... ... | 188 | 118 | − 70 |
| From Germany ... .. ... | 128 | 95 | − 33 |
| *Metallic filament lamps—* | | | |
| Total ... ... ... | 253 | 158 | − 95 |
| From Holland ... ... ... | 185 | 106 | − 79 |
| *Measuring instruments and parts—* | | | |
| Total ... ... ... | 260 | 265 | + 5 |
| From Germany ... ... ... | 70 | 98 | + 28 |
| „ France ... ... ... | 39 | 68 | + 29 |
| „ Switzerland ... ... | 119 | 74 | − 45 |
| *Telegraph and telephone apparatus—* | | | |
| Total ... ... ... | 79 | 93 | + 14 |
| From Germany ... ... ... | 9 | 7 | − 2 |
| „ France ... ... ... | 40 | 55 | + 15 |
| „ Great Britain ... ... | 21 | 19 | − 2 |
| *Electrical and electro-technical apparatus and parts not elsewhere specified—* | | | |
| Total ... ... ... | 1,978 | 2,389 | + 411 |
| From France ... ... ... | 777 | 708 | − 69 |
| „ Germany ... ... ... | 505 | 708 | + 203 |
| „ United States ... ... | 133 | 430 | + 297 |
| „ Holland ... ... ... | 153 | 179 | + 26 |
| „ Great Britain ... ... | 103 | 96 | − 7 |
| **Exports.** | | | |
| *Dynamo-electric machines—* | | | |
| Total ... ... ... | 1,137 | 2,021 | + 884 |
| To Belgian Congo ... ... | 75 | 444 | + 369 |
| „ Argentina ... ... ... | 74 | 359 | + 285 |
| „ Brazil ... ... ... ... | 202 | 135 | − 67 |
| „ Great Britain ... ... | 49 | 209 | + 160 |
| „ Holland ... ... ... | 98 | 121 | + 23 |
| *Dry batteries—* | | | |
| Total ... ... ... | 16 | 47 | + 31 |
| To Greece ... ... ... ... | 7 | 11 | + 4 |
| „ Holland ... ... ... | 1 | 20 | + 19 |
| *Accumulators and plates—* | | | |
| Total ... ... ... | 107 | 404 | + 265 |
| To Belgian Congo ... ... | 107 | 340 | + 233 |
| „ Argentina ... ... ... | 6 | 215 | + 209 |
| „ Spain ... ... ... ... | 11 | 40 | + 29 |
| „ Holland ... ... ... | 27 | 65 | + 38 |
| *Insulators of porcelain, glass, &c.—* | | | |
| Total ... ... ... | 197 | 164 | − 33 |
| To Belgian Congo ... ... | 30 | 31 | + 1 |
| „ France ... ... ... | 107 | 74 | − 33 |

| | 1925. Thous. kg. | 1926. Thous. kg. | Inc. or dec. Thous. kg. |
|---|---|---|---|
| *Cables, submarine and underground—* | | | |
| Total ... ... ... | 1,315 | 3,654 | +2,339 |
| To Belgian Congo ... .. | 32 | 171 | + 139 |
| „ Germany ... ... ... | 287 | 516 | + 229 |
| „ Argentina ... ... ... | 130 | 66 | − 64 |
| „ Great Britain ... ... | 415 | 1,650 | +1,235 |
| „ Holland ... ... ... | 13 | 192 | + 179 |
| „ Siam ... ... ... ... | — | 520 | + 520 |
| *Insulated wire and cable—* | | | |
| Total ... ... ... | 2,736 | 2,517 | − 219 |
| To Germany ... ... ... | 393 | 103 | − 290 |
| „ Belgian Congo ... ... | 68 | 115 | + 47 |
| „ Brazil ... ... ... ... | 15 | 260 | + 245 |
| „ Great Britain ... ... | 848 | 1,017 | + 169 |
| „ Holland ... ... ... | 265 | 238 | − 27 |
| „ Argentina ... ... ... | 345 | 79 | − 266 |
| *Insulating tubes—* | | | |
| Total ... ... ... | 342 | 371 | + 29 |
| To Germany ... ... ... | 245 | 65 | − 180 |
| „ Egypt ... ... ... ... | 19 | 150 | + 131 |
| „ Greece ... ... ... ... | 16 | 47 | + 31 |
| *Metallic filament lamps—* | | | |
| Total ... ... ... | 25 | 39 | + 14 |
| *Measuring instruments and parts: meters—* | | | |
| Total ... ... ... | 30 | 103 | + 73 |
| To Argentina ... ... ... | 1 | 25 | + 24 |
| *Telegraph and telephone apparatus—* | | | |
| Total ... ... ... | 622 | 1,732 | +1,110 |
| To China ... ... ... ... | 2 | 121 | + 119 |
| „ Spain ... ... ... ... | 130 | 677 | + 547 |
| „ Australia ... ... ... | 16 | 95 | + 79 |
| „ France ... ... ... ... | 44 | 68 | + 24 |
| „ Italy ... ... ... ... | 10 | 72 | + 62 |
| „ Norway ... ... ... | 64 | 69 | + 5 |
| „ Holland .. ... ... | 22 | 88 | + 66 |
| „ Switzerland ... ... ... | 91 | 199 | + 108 |
| *Electrical and electro-technical apparatus and parts not elsewhere specified—* | | | |
| Total ... ... ... | 587 | 941 | + 354 |
| To Belgian Congo ... ... | 19 | 24 | + 5 |
| „ Germany ... ... ... | 2 | 26 | + 24 |
| „ Egypt ... ... ... ... | 10 | 77 | + 67 |
| „ France ... ... ... ... | 130 | 130 | — |
| „ Holland ... ... ... | 13 | 62 | + 49 |
| „ Syria ... .. ... ... | 3 | 135 | + 132 |
| „ Siam ... ... ... .. | — | 46 | + 46 |
| „ Great Britain ... ... | 239 | 18 | − 221 |

# Heat for Factory Processes.

## A system of heat transmission with special reference to the cable industry.

THE generation and utilisation of heat in the most effective and economical manner is becoming more and more important as the necessity becomes evident of reducing manufacturing costs. Except in special cases where favourable circumstances permit the use of electricity, the use of steam heating and direct firing, that is, the direct heating of vessels by means of coal or coke fires, or gas or oil burners, has been until comparatively recently almost universal in all industries. In many instances, however, steam heating and direct firing as a means of applying heat to material under treatment fall very far short of the ideal, and they have been adopted merely because better methods have not been available.

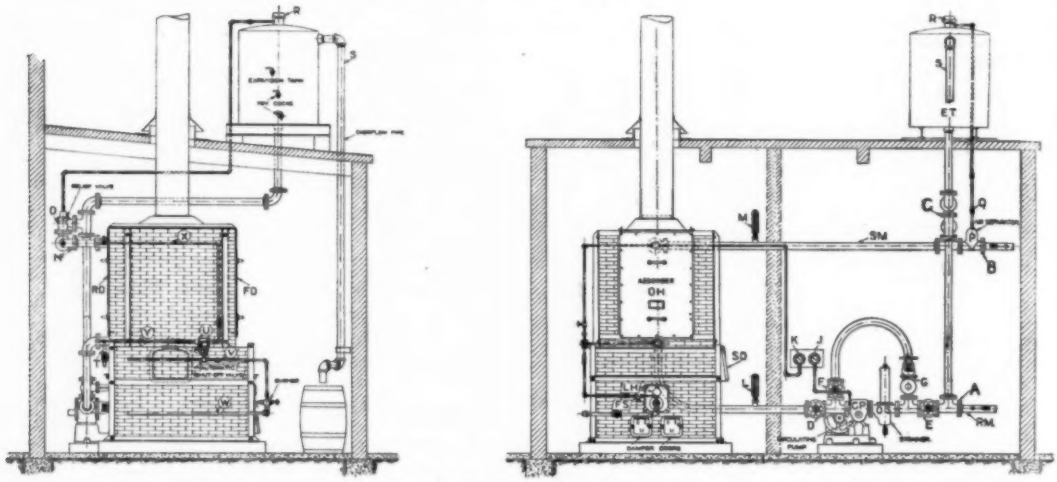
This is as true in cable making as in many other industries, all of which provide numerous instances where vast improvements in efficiency can be effected. Apart from special applications with which other defects become apparent, steam heating suffers from the general disadvantage that the temperatures which can be reached and maintained are dependent on the boiler pressure available and the pressures which the heating vessels can withstand. For instance, a steam pressure of 100 lb. corresponds to only 338 deg. F., and very much higher temperatures are frequently required. Similarly direct firing, although it is less limited in range of temperature, has disadvantages which more than offset its value as a means of obtaining a high temperature. For instance, it is extremely inefficient thermally, it is not conducive to accurate temperature control and often causes high local temperatures which spoil the product and burn the walls of the vessel.

The advantages of using oil for heat transmission, in preference to the above methods of heating, were realised many years ago, and several attempts were made to obtain in practice the obvious theoretical advantages, such as the ability to supply heat to any process at a high temperature without a high working pressure and with an improved thermal efficiency. For the most part these efforts were unsuccessful through a lack of appreciation of the fundamental principles involved, but a heating system believed to be quite satisfactory, embodying the principle of heat transmission by means of oil, has now been developed, and is available for general application in industrial processes. The system referred to is the Merrill patent oil circulation system, which is in the hands of the Kestner Evaporator & Engineering Co., Ltd. Apart from the very large number of installations which have been in continuous operation for several years in chemical works, roofing felt, oil hardening, and other industries in this country and abroad, a large proportion of the cable factories in America have adopted this system, and it is now attracting attention from English manufacturers of cables and insulated wire, for whom several successful installations have already been put down.

Essentially the plant consists of a central oil-heating unit from which the hot oil is distributed through the works, by suitably arranged pipe lines. Fig. 1 shows the arrangement of a typical heating unit, which consists of the furnace in which the oil heater or absorber is mounted, an oil-circulating pump, an expansion tank, and the necessary piping arrangements and fittings.

The design of the absorber is the result of many years of practical experience, and is such, it is claimed, that provided a suitable oil is used there is absolutely no danger of carbonising or burning out of the tubes. The pump ensures positive and rapid circulation of the oil through the system, the expansion tank providing for the change of volume in the oil as it is heated and cooled.

From the heating unit the hot oil is delivered at the point



A, B and C, connection points to external system; D and E, isolating valves; F, by-pass valve; G, filling connection; J, delivery pressure gauge; K, outlet pressure gauge; L, inlet thermometer; M, outlet thermometer; O, relief valve; P, air separator; Q, air-drain valve; R, filler cap; S, overflow pipe; T, oil drum; U, fuel shut-off valve; V, fuel supply line; W, compressed-air line; X and Y, valve connections; LH, lighting hole; OH, oil heater; FS, oil filter; OS, oil strainer; CP, circulating pump; SM, supply main, RM, return main; ET, expansion tank; RD and FD, absorber inspection doors; SD, furnace inspection door.

Fig. 1.—Typical Oil-Transmission Heating System.

A, to which connection is made by suitable pipe lines to the plant to be heated, and the oil, after passing through the jackets or heating coils, returns to the point B. There is thus a complete circuit from which the only losses of heat are those due to radiation. The application of oil heating in cable and insulated-wire manufacture is largely in connection with the melting and heating of pitch, wax and high-melting-point compounds generally. The rate of heating with the oil-transmission system is claimed to be very much greater, while materials of higher melting points can be used. An existing steam plant, if converted to oil heating, would be capable of a much increased output, and at the same time could treat at a higher temperature, thus improving manufacturing conditions and enabling special compounds to be used.

Oil heating may also be applied with advantage to the heating of h.p. cable impregnators, and an important point

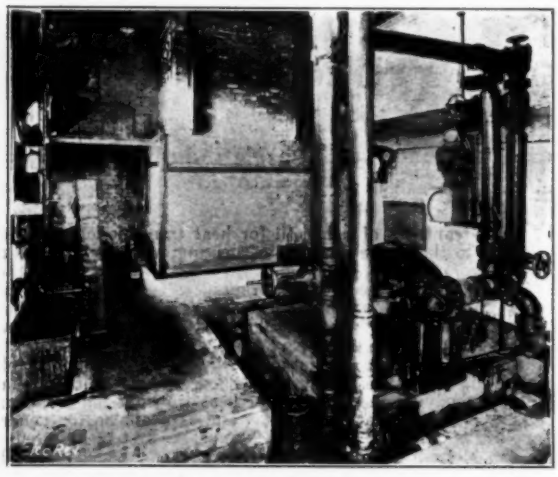


Fig. 2.—A 2,000,000-B.th.u. per hour Installation.

in its favour in this connection is the impossibility of moisture finding its way into the cable from the jackets. As is well known, precautions are taken to dry the cable thoroughly before impregnation and to prevent the ingress of moisture at any stage of the process, and yet until quite recently h.p. steam had been employed universally for heating the impregnators. With steam there is always the danger of a slight leak from the jackets into the vessel, the detection of which is not always easy, and which may cause serious damage to the product, whereas with oil, not only is the danger of a leak developing very greatly reduced on account of the low working pressure, but if it did occur it could not do any great harm, and would be easily detected. The same heating unit may be connected to any number of impregnators, and may also be used to advantage for heating the compound storing and mixing tanks.

In conclusion it may be remarked that, apart from the cable industry, oil heating is also successful in use in a number of other industries, for instance, in the manufacture of dyes, roofing felt, synthetic chemicals, varnish, and accumulator cases.

Fig. 2 shows the absorber, circulating pump, and other auxiliaris of an actual heating unit of two million B.th.u. per hour capacity installed in a factory in this country.

# A New Current Limiter.

### A Norwegian Development.

A POPULAR form of electricity tariff in Norway is the fixed charge per annum with no restriction on the period of consumption. This has resulted in the introduction of a current limiter, by Messrs. N. Jacobsen's Elektriske Verkated A/s, of Oslo, Norway, which is claimed to be immune from the disadvantages which are borne by other apparatus of its class, principally that the consumer might be able to derive an unjust advantage from the limiter in the case of heating apparatus, by using it on an intermittent circuit, and the inconvenience caused to the consumer, should his loading be slightly and accidentally increased, in not having sufficient light to see to the necessary reduction of his loading.

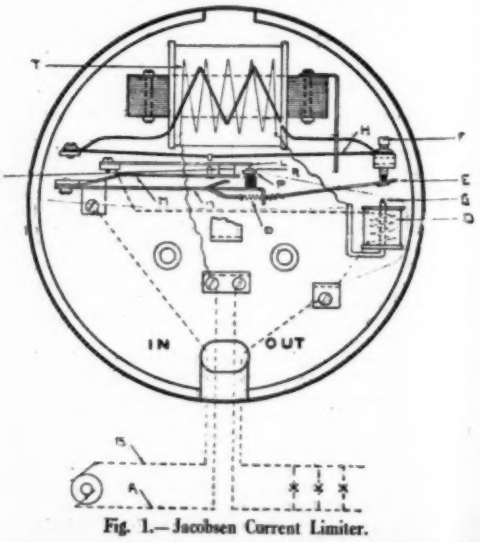



Fig. 1.—Jacobsen Current Limiter.

The instrument, which is designed exclusively for single-phase a.c., consists primarily of an overload relay, contact breaks, and a transformer, the secondary circuit of which embodies a heating wire used in regulating the periodical breaking of the circuit when the loading limit is exceeded. Fig. 1 illustrates the principle of the device. The two supply

leads are taken into the limiter, but A is only looped, and merely supplies the primary of the transformer T. The second wire B is led to the contact breakers, one of which is suspended by the heating wire H, and then passes on through the relay coil D to the consumer's circuit. This relay acts upon the anchor E, which normally is in contact with the screw F, and immediately the loading exceeds a predetermined value it strikes downwards on to the contact G and closes the transformer primary. The springs L and M are normally in contact at C by virtue of the heating wire, from which the lower spring is suspended, and which short-circuits the transformer secondary. The arm N acts upwards against the coupling P, and in its movable end carries an anchor E, which is held off the relay core at G by a spiral spring O. Immediately the loading limit is exceeded the anchor is drawn downwards on to G, and the transformer is coupled up and brought into action. The current induced in the secondary circuit of the transformer then causes the heating wire to become warm and expand, and it immediately sags downwards, allowing the springs L and M to fall. Spring L thereupon makes contact with R, while M moves still further, and first opens the contacts C, whereby the main circuit is broken, and finally strikes against the upper fork of arm N, which is lowered until the tension on spring O is such as to force the anchor E back against the regulating screw contact F, when the transformer is again deprived of current; the heating wire then cools, the spring M once more closes the main circuit, and the contact R puts in circuit a resistance wire (dotted line) laid parallel to the relay coil. The object of the last operation is to compensate for the "rush" current when the main circuit is closed, otherwise the apparatus would not come to rest until the load was reduced to a value far below that of the load limit. With this parallel connection, of course, the whole of the current does not act upon the relay coil at once, but with the load at 50 or 100 per cent. in excess of the limit the anchor E will be thrown over again immediately. This occurs so quickly that a metal filament lamp, for instance, is not given time to light up at each closing of the circuit, while the intervening periods of darkness are of constant duration. When the excess loading is great the limiter does not permit any energy to pass through the circuit at all, but acts as if the whole installation were uncoupled by means of an ordinary switch. Normally the entire load must pass through the relay coil, and in the case of small overloads the circuit will remain closed between the breaks for a sufficient time to allow the loading to be reduced. The current limit is regulated by means of the screw F. The device is enclosed in an iron cover, which is secured by a lead seal in front on the outer side of the screw nut. The limiter is stated to have been tested with approximately one million breaks at 30 A on a 220-V service, and to be capable of breaking 30 A for a very long period without sustaining any damage. The regulation is claimed to be absolutely constant, and the employment of this type of limiter has reduced the control and repairing expenses at the electricity works by quite an appreciable amount.

Messrs. Jacobsen's representative in this country is Mr. C. H. Smith, London.

# Economic Value of Increased Steam Pressure.

## Some results of investigations on the effects of steam-pressure increase on operation and plant efficiencies and costs, with considerations on the selection of particular pressures.

By H. L. GUY.

(*Abstract of a Paper read before the* NORTH-WESTERN BRANCH *of the* INSTITUTION OF MECHANICAL ENGINEERS.)

IN the pursuit of increased efficiency of steam power plant in the last decade, the range of steam conditions with which it operates has been increased and the character of the cycle employed has been modified. The success attending these developments, coupled with the increase in size of the plant involved and the greater skill with which it is operated, is illustrated by the fact that in the last 10 years the thermal efficiency of the best power stations has been improved by some 50 per cent. Steam pressures have been materially increased, steam temperatures have shown some advance, and the vacua obtained with given water tempera-

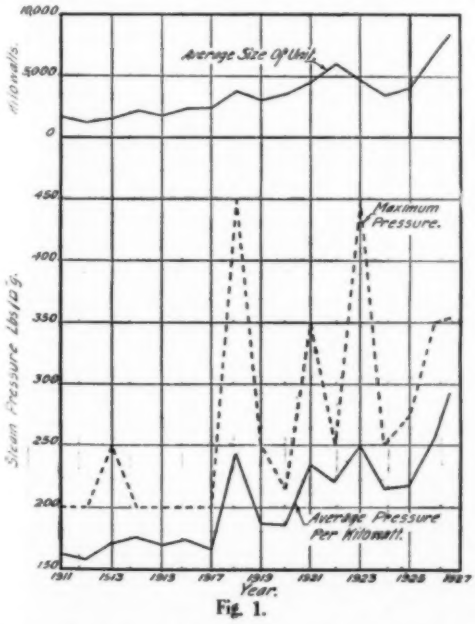



Fig. 1.

tures have been increased. Of these the change in steam pressure, still in a state of flux, is perhaps the most striking; the maximum steam temperature has in recent time shown a tendency to become stationary, and vacua, with given water temperatures, if anything, appear to be slightly reducing.

The steam cycle itself has changed as the result of the general adoption of regenerative feed heating, by the extraction of steam from the turbine at successive points in its expansion, and also, in some cases, by taking the steam out of the turbine after partial expansion and resuperheating it before returning it for expansion to be completed. The advantage to be derived from both these operations is a function of the initial steam pressure. The way in which the average steam pressure adopted has changed with time, based on the orders received by the firm with which the author is associated, is shown in fig. 1. The maximum pressure for which plant was ordered is also plotted. The first considerable peak shown is of historical significance, representing, as it does, the first commercial installation employing a considerably increased steam pressure, multiple-stage turbine or "regenerative" feed heating and resuperheating.

TABLE I.

| Power Station | Output. Initial kW. | Ultimate kW. | Size of units kW. | Steam conditions before stop valve of turbine. Gauge pressure lbs./□"g. | Temp. °F. |
|---|---|---|---|---|---|
| North Tees (1)... | 60,000 | 100,000 | 20,000 | 450-500 | 650 |
| Barton (Manchester) | 82,500 | 160,000 | 27,500 | 350 | 700 |
| Trenton Channel (Detroit) | 150,000 | 300,000 | 50,000 | 375 | 700 |
| Philo (3) ... | 80,000 | 240,000 | 40,000 | 550 | 725 |
| Crawford Ave. (Chicago) (3) | 160,000 | 750,000 | 50,000<br>60,000 | 550 | 725 |
| Barking (London) (2) | 120,000 | 500,000 | 20,000<br>40,000 | 350 | 700 |
| Columbia (Miami Fort) (3) | 90,000 | 360,000 | 45,000 | 550 | 725 |
| Weymouth | 82,900 | 400,000 | 3×3,150<br>32,000 | 1,200<br>350 | 700<br>700 |
| Richmond ... | 100,000 | 600,000 | 50,000 | 375 | 675 |
| East River (N.Y.) | 120,000 | 700,000 | 60,000 | 375 | 700 |
| Hudson Avenue | 150,000<br>240,000 | 400,000 | 50,000<br>90,000 | 265<br>375 | 614<br>700 |
| Rummelsburg (Berlin) | 240,000 | 600,000 | 70,000<br>10,000 | 462 | 752 |
| Langerbrugge | 26,400 | | 1,600<br>6,600 | 710 | 822 |

(1). Reheating to 500 deg. F.
(2). " 700 "
(3). " 725 "

In Table I certain particulars are given of notable h.p. stations; this list is illustrative rather than exhaustive, and is inserted to emphasise the considerable extent to which

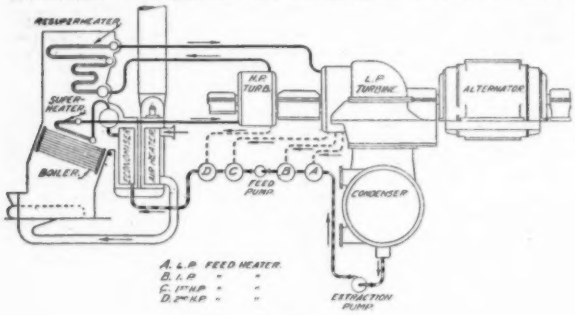
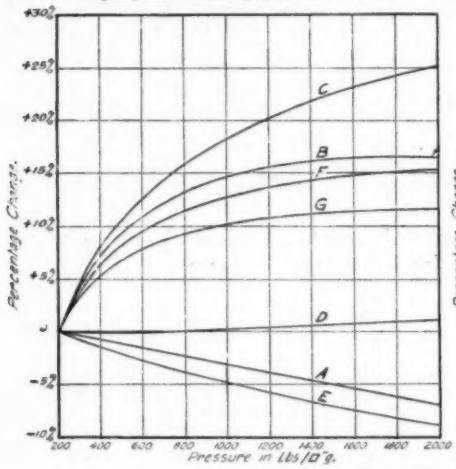



Fig. 2.

this movement has grown in all parts of the world and some of the mile-stones on the way.

It is the purpose of this paper to consider how far increase of steam pressure affects the efficiency of operation; some of its effects on the character and cost of the individual units comprising the whole plant, and what guidance can be obtained in the selection of the pressure appropriate to any particular case. Fig. 2 illustrates diagrammatically the type of complete installation considered.




700 deg. F., stop valve; 29-in. vac., exhaust.

Fig. 3.

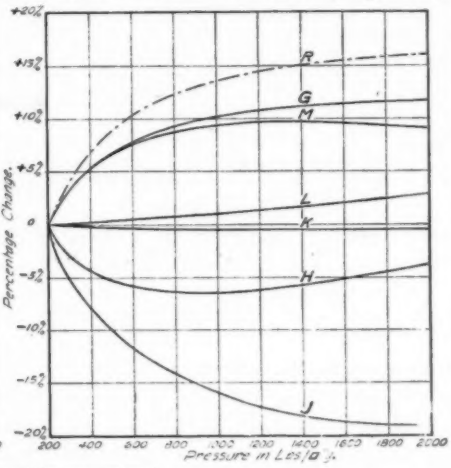


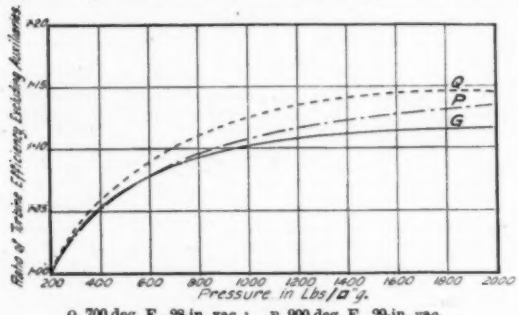

Fig. 4.

In order to consider the gains to be expected from the adoption of increased pressures in a simple condensing-turbine installation, steam will be assumed to be supplied to the machine stop valve at a normal total temperature of 700 deg. F. In commercial operation the possibility of the total temperature being 50 deg. F. above normal, necessitates plant suitable for a maximum total temperature of 750 deg. F.; operation with a moderate pressure for a given total temperature is rather more safe than at high pressure, for as the pressures increase so do the maximum stresses in certain parts of the plant. Maintaining the superheat constant and imagining the total temperature to increase with the pressure is inexcusable. A vacuum of 29 in. Hg. with 30 in. barometer has also been adopted. The calculations throughout are based on Callendar's enlarged steam tables.

Steam at 200 lb./sq. in. g. pressure is taken as a basis, and an individual stage efficiency of 80 per cent. chosen for dry steam in the turbine designed for this condition. The variation with pressure of the total heat supplied to the steam, expressed as a ratio of that for 200 lb./sq. in. is plotted in curve A, fig. 3. Curve B gives the variation of available adiabatic heat drop; while C, the ratio of B and A, gives the first approximation to the variation in thermal efficiency. The correction for the variation in the reheat factor is given in D; E shows the variation in efficiency due to the condensation which takes place as expansion proceeds, made at the rate of 1 per cent. loss in efficiency for each 1 per cent. mean wetness in the stage considered, approximating the loss in a straight condensing turbine; F is the corrected efficiency curve from D and E, and G gives the final efficiency, corrected for the remaining turbine losses at the rate of 1 per cent. increased loss for each time the pressure is doubled.

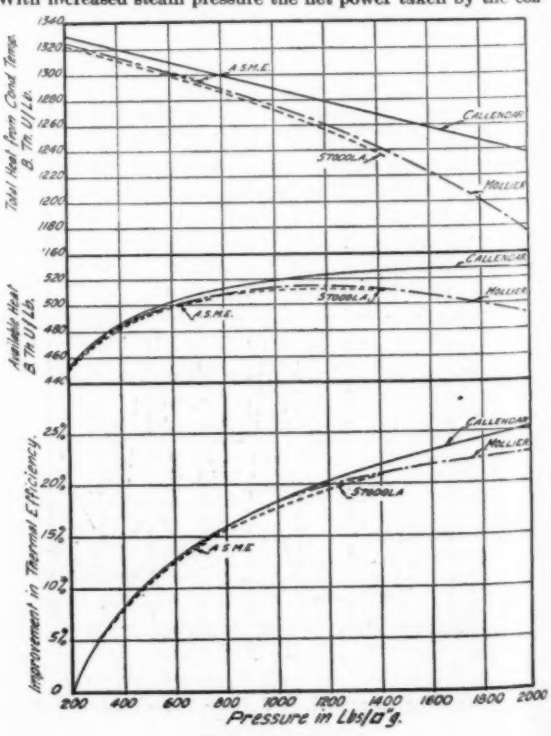
This relatively small rate is obtainable only in plant of reasonable size for the speed at which it operates, which suggests the expedient of gear driving the h.p. end of the turbine, in order to keep such losses within the limits stated, at lower outputs than would otherwise be possible. The presence of the gear introduces an additional loss of from 1¼ to 2 per cent. of the power it transmits, or slightly lower where a second generator is driven.

As the steam pressures are increased the power absorbed by various auxiliaries is affected, and, in turn, the heat consumption of the plant at economic output. The steam consumption per kW generated varies as in curve H, fig. 4. The change in the power taken by the feed pump consequently varies as in curve L, expressed in similar terms. Electrically driven feed pumps were assumed, having a normal output corresponding to the steam quantity at the maximum continuous rating, and the discharge pressure was taken as 50 lb./sq. in. greater than the steam pressure at the turbine stop valve. The pump efficiency varied from 75 per cent. at 250 to 65 per cent. at 2,050 lb./sq. in., and the motor efficiency was taken as 90 per cent. for the normal pump duty throughout. As the pressure increases the amount of dry steam to be condensed decreases rapidly, as shown in curve J. The power taken by the condenser auxiliaries has been assumed as varying directly with this. The power taken by the boiler stokers and fans decreases with the coal to be burnt, and has, therefore, been taken as varying inversely as curve G. With increased steam pressure the net power taken by the condenser auxiliaries, stokers and fans decreases as in curve K. Curve G, corrected for the variation in the power of the




Q, 700 deg. F., 28-in. vac.; P, 900 deg. F., 29-in. vac.
G, 700 deg. F., 29-in. vac.

Fig. 5.




700 deg. F., 29-in. vac.

Fig. 6.

auxiliaries affected by steam pressure, results in curve M, showing the net gain with increasing steam pressure. Curve A gives the variation in thermal efficiency to be expected for an installation employing four turbine feed heaters in a regenerative cycle, and having boilers fitted with economisers and air heaters, and from which Table II has been compiled.

The last column gives the series of pressures at the turbine stop valve, which correspond approximately to equal increments in the thermal efficiency. Undoubted advantages would result if the standard pressures adopted were chosen on some such basis as this, and also from fixing standard flanges to be adopted for such pressures. It is regrettable that at present the B.E.S.A. tables do not extend beyond 325 lb./sq. in.

Fig. 5 shows curves corresponding to curve G, fig. 3, for other steam conditions. It should be pointed out that the increased gain at 28 in. vacuum would be reduced from 2.85 per cent. to 2.05 per cent. if regenerative feed heating were adopted in both cases and the effect of auxiliary power taken into account.

The variations in the total heat and the heat drop available in adiabatic expansion with pressure which would be deduced from the work of some of the major authorities are plotted in fig. 6. From the resulting thermal efficiency ratios it will be gathered that the three other authorities would suggest gains resulting from the use of the highest pressures sensibly less than those arrived at on the basis of Callendar's tables. It must be remembered that the data employed for such tables has been obtained from experiments covering a very limited range, not nearly embracing that covered by current engineering practice.

TABLE II.

*Increments of Pressure for 3 per cent. Thermal Gain.*

| Accumulated thermal gain, per cent. | Corresponding increment in pressure, lbs./sq. in. | Change in pressure, lbs./sq. in. | Approximate corresponding pressure, lbs./sq. in. |
|---|---|---|---|
| 3 | 65 | 200-265 | 250 |
| 6 | 95 | 265-360 | 350 |
| 9 | 140 | 360-500 | 500 |
| 12 | 255 | 500-755 | 750 |
| 15 | 570 | 755-1325 | 1300 |

*(To be continued.)*

# Kiosk Sub-Stations.

**English Electric Co. kiosk equipment, embodying alternative h.p. control apparatus and totally enclosed l.p. switchgear.**

THE advantages of the kiosk type of substation have been fully discussed, and may be summarised briefly as cheapness, convenience, and efficiency, provided always, of course, that the design is sound. Among the firms which

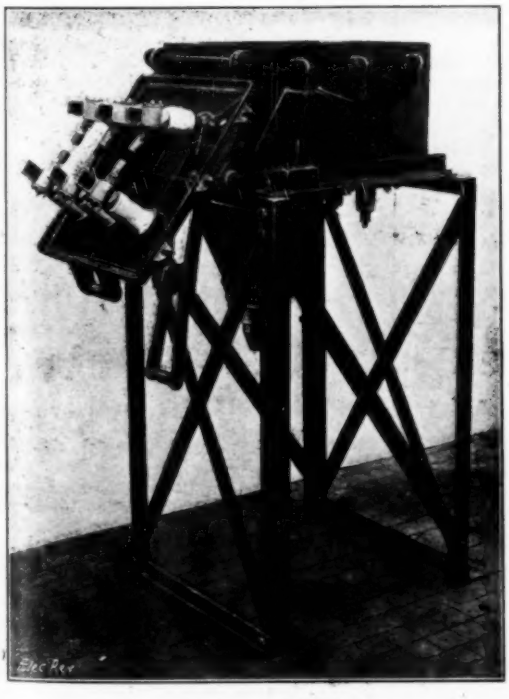


Fig. 1.—Oil-immersed Switch Fuse.

are giving attention to equipment of this description is the English Electric Co., Ltd., and we have received the following particulars of the products in question. Alternative control apparatus may be supplied with the kiosks, and may include on the h.p. side merely isolating switches or fuses, or oil-immersed circuit-breakers may be provided in addition. The fuses employed are of the "Zed" fuse family, and are claimed to have been found extremely successful on comparative tests and in service, no deterioration taking place at ordinary temperatures.

One of the latest productions of the company is the oil-immersed switch fuse, fig. 1, which may also be incorporated in the kiosk equipment in place of the cartridge fuse. The fuse portion, when closed, is immersed in oil contained in a strong

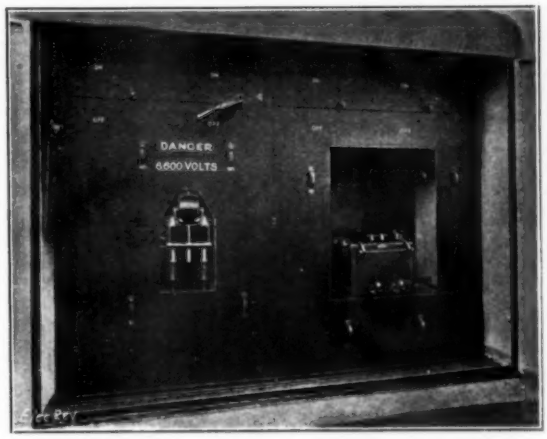



Fig. 2.—H.P. Kiosk Equipment.

welded steel-plate tank, to which is hinged and bolted a cast-steel top. The complete unit is very substantially constructed, and is rated for a rupturing capacity of 50,000 kVA. An interlocking device is incorporated to prevent the fuse being placed in circuit before the lid is properly down. Of course, oil-immersed circuit-breakers give the best protection, but they need only be included where the expense is justified. A particularly effective combination of oil-circuit-breaker and oil switch-fuse can be installed for use on ring-main feeders. The provision of an oil circuit-breaker in each kiosk, together with a suitable arrangement of isolating switches, makes it unnecessary to shut down the ring in the case of a cable fault

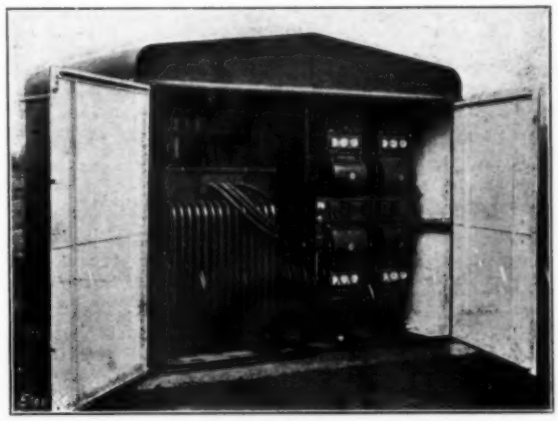


Fig. 3.—Kiosk Substation, L.P. Side.

in one section. A kiosk equipped in this manner and supplied recently for use on a large corporation network is shown in fig. 2. The transformer itself is supplied through an oil-immersed switch-fuse, and the illustration shows the thorough manner in which the h.p. connections are screened, so that no live metal is accessible on opening the kiosk doors. Fig. 3 is a view of the reverse side of this kiosk showing the totally enclosed l.p. switchgear employed, a feature which is strongly recommended by the makers. The transformers employed are of the double-wound, oil-immersed, self-cooled, delta-star type, with the neutral point brought out to a terminal. Tappings are provided in the h.p. windings, which can be connected either to an internal stud board or to a tapping switch. The latter is operated from outside the tank by means of a handwheel. It is standard practice with the English Electric Co. to provide a separate lock and key on the doors giving access to the power transformer, and to screen this chamber so that it is only accessible to an inspector or other person carrying the special key. In the ordinary course the transformer chamber would remain locked even when the doors to the h.p. and l.p. switchgear were open.

# Selected Radio-Telephone Apparatus.

## Recent Developments and Improvements.

### M-L Wireless Generators.

As a result of its application of cobalt steel to the manufacture of magnetos, the M-L Magneto Syndicate, Ltd., has developed a range of machines fitted with permanent field systems, comprising motors, generators, and rotary transformers (*i.e.*, the armature carries two independent windings connected to two separate commutators), which are lighter and more compact than machines having wound field magnets, whilst special attention has been paid to quietness of running, balance of rotating parts, freedom from electrical ripple, and

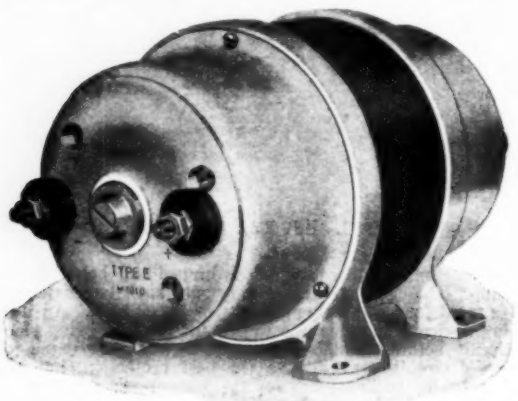


Fig. 1.—A Rotary Transformer.

sparkless commutation. While the machines are suitable for any service for which the orthodox type is normally employed, the employment of a permanent field renders them particularly adapted for certain classes of service. The voltage generated is a linear function of the speed, and the machines are eminently suitable for wireless transmission sets, having the important advantage of possessing better regulation and greater

Fig. 2.—M-L Anode Convertor.

inherent stability than a machine of orthodox type, where fluctuations in load, due to keying or modulation, will cause changes in the field current and strength. When d.c. is available a rotary transformer is preferable to two coupled machines, for charging batteries, for supply of power to small transmitting sets, large amplifiers, and public address systems. The machine is specially designed to reduce the amount of ripple, making the output comparatively easy to "smooth," and when used for reception purposes fine control of output can be obtained by inserting a rheostat in the l.p. circuit. In general laboratory work the machine has many uses, including insulation testing of dielectrics, flash testing of insulation, operation of cathode-ray oscillographs, and the supply of power to valve oscillators of all descriptions. As a generator the machine's output is 100 watts, if wound for a voltage not exceeding 600 V; and 80 watts if wound for between 600 and 1,000 V. As a rotary transformer (fig. 1) it is an excellent source of anode current for low-power transmission work, and is capable of delivering 60 watts up to 100 V, and 50 watts between 600 and 1,000 V. It can be wound for any d.c. input from 12 to 240 volts, and its overall efficiency is 55 per cent. at full load. Ball bearings are fitted, and the brush gear is protected by a cap which can be easily removed for inspection of the commutators. The addition of a motor would make the machine into a double-current generator for energising the anode and filament circuits simultaneously at two voltages.

The standard M-L anode convertor (fig. 2) is also of interest, for it has been designed to replace anode batteries in valve receiving sets and low-power transmitting sets. The machine, which is enclosed with accessories in an aluminium case, is a small permanent-magnet motor-generator, designed to take current from a low-voltage battery (generally the same as that which supplies the filaments) or country house plant, and to deliver current at two voltages simultaneously: a comparatively high one for the l.f. valve anodes and a lower one for the h.f. and detector valves. Provided with an l.p. control rheostat, whereby the convertor can be started and stopped and the output voltage regulated between wide limits, they are also fitted with an l.p. choke and with smoothing circuits on both the h.p. outputs. The convertor's overall dimensions are 17 in. in length and 5 in. in width and height, whilst the largest type weighs but 17.5 lb.

### The "R.I." Battery Eliminator.

In order to enable the anodes of the receiver valves to be energised from the domestic a.c. mains and thus eliminate the high-voltage battery, an instrument has been placed on the market by Radio Instruments, Ltd., which comprises a power transformer wound for the voltage of the supply mains to operate a 5-volt double-electrode full-wave rectifying valve and a double-wound power choke having a total inductance of 40 henries for the smoothing circuit; a set of 3-wire wound resistances of 20,000 ohms each, a bank of fixed condensers having a total capacity of 11 $\mu$F, and a rheostat for regulating the filament of the valve, are also provided. The consumption of power from the mains is only 5 to 10 watts, whilst two output voltages are provided, one being fixed at approximately 130 V for low-frequency and power valves, while the variable one for the detector and high-frequency valves will give three values of 35, 45, and 65 volts. The set is both neat and compact, the

Fig. 3.—The "R.I." Anode Battery Eliminator.

whole of the parts being contained in a substantial metal case, finished to imitate the appearance of leather, as shown in fig. 3; its weight is 14 lb., and dimensions are 8½ in. long, 6¾ in. wide, and 6¾ in. deep, being made for input pressures of 120 V or 250 V at from 40 to 100 cycles, but those who prefer to build their own eliminator may purchase a complete range of component parts for the purpose. The transformer and choke windings possess a very small d.c. resistance, so that the circuit loss is small; for instance, the resistance of the choke coils is only 190 ohms each: they will carry up to 80 milliamps. Should the domestic supply be d.c., the transformer and rectifying valve are replaced by a resistance, tapped at 2,800, 5,000, 7,000, and 9,000 ohms, suitable for carrying 50 milliamps. In both cases the earth connection of the receiving set should be made through a 1 $\mu$F fixed condenser.

# The Southern Railway Contract.

## Statements by the Various Parties.

We give below either copies or abstracts of the statements that have been issued by the Southern Railway Company, by Mr. D. N. Dunlop, the Director of the B.E.A.M.A., by the board of the General Electric Co., Ltd., and by others, respecting the £120,000 contract for rotary convertors and transformers required by the Railway Company, which was placed with the Swedish General Electric, Ltd., for its parent concern, Allmanna Svenska Elektriska Aktiebolaget.

While we allow these statements to tell the story, we devote a leading article to some of the general considerations arising, and in addition we may quote here a few impressions gained from Mr. Dunlop. It seems that the Railway Company would have acted with greater fairness to the British manufacturers interested if they had included in their statement an acknowledgment of the fact that these firms had advanced modifications in their proposals to meet the criticisms of the Railway Company. The stipulation of the General Electric Co., Ltd., that there should also be placed with them an order for switchgear was regarded as an objectionable condition, but it also appears that the Swedish company made it a condition that they should receive the transformer contract, and the Railway Company have thus penalised the British transformer firms against whom they had no grievance. It is understood that the Metropolitan-Vickers Electrical Co., Ltd., and Messrs. Mather & Platt, Ltd., were perfectly willing to undertake the contract, but the attitude of the Railway Company was opposed to this course because they wished to standardise on a machine already installed. By going out of the country and bringing in another machine they have defeated their own end in this particular. There is little reason to doubt that either the Metropolitan-Vickers Co. or Mather & Platt, Ltd., or Bruce Peebles could have fulfilled the requirements of the specification, and it is felt that this must have been known. The statement that it was impossible for the Railway Company to avoid "rings" or "pooling arrangements" by purchasing on the Continent has been traversed, and the Swedish General Electric, Ltd., has made its own declaration that its parent concern does not belong to the Continental ring, and that its prices are not dictated by such a ring. Questions have been raised regarding the actual connections of the A.S.E.A. with Continental companies, and it would be interesting if the precise facts could be stated.

### Statement Issued by the Southern Railway Company.

The following statement appeared in the Press on April 19th:—The Southern Railway Company, as is generally known, have for some years past been engaged in the extensive electrification of their suburban area. They have already spent about £10,000,000 on this work, and their considered policy has always been to place their orders for the necessary plant and equipment with British firms wherever possible. On occasion, the maintenance of this policy has been rendered difficult by the existence between electrical manufacturers of agreements which have enabled them to fix and quote identical prices. Nevertheless, in connection with the electrification of the Eastern section (opened last year) the company placed the contracts for the supply of rotary convertors with three British firms. On that occasion the plant was ultimately purchased, after weeks of negotiation, at prices considerably lower than those originally quoted. For the next stage of electrification now being undertaken, the company, in continuance of their policy of purchasing British-made plant, recently invited tenders for the supply of the requisite rotary convertors from the same three British firms who had supplied the previous machines. The response to this invitation was an offer by two of the firms jointly to supply only fourteen machines out of the twenty-three required, one of the firms declining to quote without giving any reason. Of these fourteen machines, the supply of seven was made conditional upon the contractor receiving from the company an order for certain other electrical apparatus which had formed the subject of a separate inquiry, and for which, in fact, the company had received a more favourable tender from another firm. The offer of fourteen machines was subsequently increased to the full twenty-three, but only on the added condition that the contracts for the balance of nine machines should be post-dated to November next. This appeared to indicate the existence, not only of a price agreement, but also of some sort of quota arrangement restricting the output of individual firms—or, in effect, dictating to the company the source of supply. In these circumstances the company had no alternative but to find a contractor who was prepared to meet their full requirements on reasonable terms and conditions, and they were reluctantly compelled to turn to Continental manufacturers. As a result, the company have placed a contract with the Allmanna Svenska Elektriska Aktiebolaget of Sweden for the supply of the whole of the rotary convertors. The value of the contract is in the neighbourhood of £120,000. The price required by the Swedish firm is appreciably less than that quoted by the British firms, but the Southern Railway Company wish to emphasise that it is not the lower price which has led them to take this step. They feel that British enterprises should not be penalised by British manufacturers who seek to dictate terms and conditions. The Southern Railway Company have not only their shareholders, but their 70,000 British employés to consider, and in placing, for the first time, an order of this kind out of Britain, they feel that eventually it will not be to the disadvantage of British industry as a whole to draw attention to a state of affairs which causes the loss of wages such an order would ensure.

### The B.E.A.M.A. Reply.

Upon the following day Mr. D. N. Dunlop, director of the British Electrical and Allied Manufacturers' Association, made a statement in reply to the railway company's contentions. Dealing with the latter's allegation of the existence of a "ring," Mr. Dunlop said that one of the necessities of modern industrial life was the arrangement of reasonable prices and the distribution of orders. The B.E.A.M.A. was justified in doing this by the enhanced prosperity of the industry; the policy had raised the average dividend paid on the capital of manufacturing firms from 1.67 per cent. to between 5 and 6 per cent., which was not an unreasonable figure. He pointed out that without co-operation in technical matters, in research and design, standardisation, &c., no industry could maintain itself in the face of foreign competition. Reasonable prices had to be obtained if proper wages were to be paid to the skilled workers. In other countries virtually all industries arranged prices and allocated business, and it was doubtful if any important orders for electrical machinery could be placed in any Continental country which would not be given to a member of a "ring." Our Free Trade system protected the home purchaser from being charged unreasonable prices. A railway company should be one of the last concerns to send an order abroad, for it depended to a greater extent than almost any other undertaking on the support of British trade. Mr. Dunlop said:—

"What happened in this case was that the Southern Railway invited tenders for these rotary convertors from three firms—the G.E.C., the English Electric Company, and the British Thomson-Houston Company. These three firms happened to be busy, and they could not carry out the order in exactly the manner which the railway company desired, whereupon, without giving other British firms the chance of taking on the contract, the company petulantly took their business to Sweden. There are at least three other firms in this country—the Metropolitan Vickers, Bruce Peebles, and Mather and Platt—which were not asked to tender, but which would certainly have executed the work within the time and supplied machines which would have filled the specifications of the railway, and that at competitive prices. It is quite untrue that there was any attempt to dictate to the railway company as to terms and conditions. The British firms frankly disclosed the fact that the arrangement existed for distributing business on an equitable basis among the manufacturers, and apparently this was objected to by the railway. Certainly, no attempt was made to charge excessive rates, for our prices are based as a rule on those which firms would quote in open competition. In the case of this contract the price quoted to the Southern was distinctly a 'cut' price."

He considered that the fact that the order had been placed abroad would do British manufacturers a great deal of harm in the foreign markets. He could not understand why the company should be irritated because the manufacturers combined and distributed business: combination had been the salvation of the railway companies, so far as they had been saved. He concluded:—"We know that they used their powers to dry up canals and generally snuff out all forms of competition of that sort. They now have to meet very keen competition in the way of road transport, and it may be that electrification will prove of enormous benefit to them in the struggle. Of course, we have no desire to irritate purchasers, and we shall certainly take this lesson to heart and try to make the application of our principles more attractive."

### Statement by the G.E.C.

Subsequently, the General Electric Co., Ltd., expressed its views in a public statement in the following terms:—

The Southern Railway have sent a communication to the Press with the object of justifying their decision to place an important contract with a Continental firm. The reader will no doubt be impressed that the railway company have made out a good case; there is, however, another side to the question. The company, quite unmindful of the monopoly which they enjoy in an important part of the country, seem to resent the fact that electrical manufacturers have taken steps to protect their industry to some extent. For years the industry has lost hundreds of thousands of pounds through unrestricted competition and through the principle prevailing here of placing contracts with the lowest bidder, while demanding guarantees of the highest performance. Research and development have been carried out at great expense by dozens of firms. The industry did not develop on a normal progressive curve, but alternately by periods of rush and periods of stagnation. During the former, unjustifiable extensions of works occurred; during the latter, all were suffering. Wages had to be squeezed under such conditions, and periods of unemployment occurred all too frequently in different parts of the country. The conditions of the war forced us to collaborate for the good of the country, and some of the principles of co-ordination which were introduced then, still exist. They have proved for the good of the industry; they have helped to improve the conditions of labour; and they have not been unfair to the consumer. They have yielded a most modest return to the investor, they have enabled us to spread the work more equally amongst the factories existing and, above all, they have enabled us to build up a quality which puts British electrical products foremost in the markets of the world. Why the Southern Railway should be of opinion that it is wrong for the electrical industry to protect itself, more than it is wrong for a railway company, trade union, the Law Society, the Stock Exchange, or any other trade or profession to do so, we fail to understand. The contract is an unusually large one from one purchaser. The company itself is likely to place only one such contract in five or ten years. Realising the capacity of output of the whole industry, it seems to the common good that such a big contract should be divided amongst a few of us so as not to interfere with the regular service to regular clients. This is all we attempted in the first instance; there was no attempt at dictation. When the Southern Railway objected to place the contract with three firms, the General Electric Co., Ltd. (who, at the present moment, fortunately have a good order book) were anxious to accept 50 per cent. of the contract. We have previously supplied such machines to the Southern Railway, which have given satisfaction. Why the Southern have not accepted our offer, we do not know. The fact that we desired, at the same time, to obtain the contract for the switchgear required for the rotaries, was a mere expediency to balance our respective shops with the most suitable class of work. We withdrew that condition when the Southern were unwilling to grant us this favour; equally so, the condition dating the contract at the later period, was withdrawn. It was therefore open to the Southern to place one half of the contract with the General Electric Co., Ltd., who had given them satisfaction, and the other half with quite a number of British firms of first-class standing, who were anxious to secure the work. The fact that the Southern had no experience with some of them, surely applies also to the Swedish company to whom they preferred to give the order. The fact that a Swedish firm can make at a cheaper price than English firms, is easily accounted for, and needs no elaboration from us. We regret the loss of this contract to this company and to the country as a whole more than we can express. We trust this statement makes it clear that if there was any attempt at dictation, that attempt did not emanate from the side of the manufacturers.

### A Non-B.E.A.M.A. View.

The *Manchester Guardian* quotes the opinion of a firm of electrical manufacturers which is not a member of the B.E.A.M.A. The view is taken that competition is far from eliminated by the Associati n's agreements for there was very considerable competition between B.E.A.M.A. concerns and independent British companies, quite apart from competition with foreign concerns, such as the Swedish company to which the Southern Railway contract had been given. "Non-ring" firms were often able to quote more attractive terms on a better article, especially in the case of smaller machines or accessories. Of course, only the larger companies in the B.E.A.M.A. were able to produce exceptionally high-powered machinery, but there were only a few orders for such machines. Our contemporary's informant said that the B.E.A.M.A. firms fixed their prices by means of a "horse-power curve" to which each firm adhered. This curve showed the relation between horse-power and price, so that in submitting a tender for a machine of, say, 200 h.p., a manufacturer would refer to this particular point on the curve, which would show him the agreed price to quote. He believed, however, that adherence to the "horse-power curve" was not absolutely rigid, and that in bidding for an order against a firm outside the "ring" or against a foreign firm, members of the "ring" frequently quoted "cut" prices to secure the contract.

### Other Views.

A letter signed "Engineer" appeared in *The Times* of April 23rd. In this the writer says that the efforts of buyers to avoid "rings" by placing orders on the Continent would be amusing if they were not so sad, for there the system of rings is far more intense than in this country. "The judgment on combinations, rings, cartels, &c., should be based not on some sentimental idea but the sound basis of the ultimate cost of producing and selling." An instance is quoted where combination would have actually reduced the price of a certain article, while giving a higher profit. With regard to the allocation of work, "Engineer" says:—"Every manufacturer knows the benefit obtained in the cost of production when the volume of work is kept at a steady level. A crowded workshop, entailing night shift and overtime, is uneconomical and unsatisfactory to the workmen, and if there is a sudden drop in the volume of work, necessitating the discharge of a number of workmen, the position becomes even less satisfactory. The general public has been taught by the discussions on the Electricity Bill the value of a steady load, and the buyers of electrical plant should be the last people to grumble at an endeavour to smooth out the peaks of the load in the workshops by some method of allocating work. Practically everything one buys has a ring price. Our daily bread, and many of the other necessaries of life, come under this category, but we do not grumble so long as we know that the price is a reasonable one. We recognise that unlimited competition would be inadvisable and likely to increase rather than diminish the selling price. The manufacturer of electrical apparatus has to buy most of the material that constitutes the product at ring prices, and the Government and municipalities insist, very properly, that labour is not to be paid at less than standard agreed rates, and the employer has no desire to lessen costs by forcing down wages which already compare unfavourably with the wages paid in the sheltered trades. If balance-sheets of the firms in a ring showed undue profits one would think it necessary to call for some public inquiry, but the dismal results shown by most of the engineering firms hardly warrant a complaint of this nature."

Mr. Henry Edmunds, who had so much to do with the initiation of the Cable-Makers' Association, writes to *The Times* stating that the objects of that body were broad-minded in nature, combining the protection of the industry from price-cutting, improved labour conditions, standardisation of quality of materials and workmanship, assuring to the customer stabilised prices and satisfactory product. The experiment has, he says, been amply justified, and it is only natural that other branches of the industry should have followed its "lead." Writing as a "spectator of the game," he adds his regret that "a large order should have gone abroad on account of a false feeling of pique occasioned by the appearance of 'dictation' on the part of certain electrical firms who were carrying out an honourable understanding in the interests of the industry as a whole."

Another correspondent, an anonymous "Electrical Engineer," thinks that the controversy will do nothing but good if it helps the public to realise the extent to which the nation is exploited by combinations of business concerns "and how much the advance of electricity in this country is hampered by these rings, which control . . . almost every other branch of the electrical industry." He proceeds to refer to the operations of the cable-makers, the accumulator makers, and the lamp manufacturers, and the arrangements existing between the last-named and the retailers. He concludes: "The statement that competition would be likely to increase prices rather than diminish them is astonishing. But why not give competition a trial again?"

### The Swedish Company's Denial.

Dealing with the implication that the Allmanna Svenska Elektriska Aktiebolaget is in a Continental "ring," Mr. S. H. Busch, the managing director of the company's subsidiary, the Swedish General Electric, Ltd., says that his company and the parent concern are an entirely independent organisation and do not belong to the Continental "ring." "The statement, therefore, that the Southern Railway have placed their order with a firm whose prices are dictated by a Continental ring organisation, is completely without foundation."

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### Colour Photo-telegraphy.

The American Telephone and Telegraph Co. announces that pictures of three or more colours can now be transmitted by wireless across the Continent, and reproduced with delicate shadings. Engineers have been experimenting for a year on coloured telephotos on the same principle as black-and-white photos. Separate transmission is necessary for each colour.

# The Venner Time-Switch Anniversary.

ON Friday last, at the Trocadero Restaurant, London, the directors of Venner Time Switches, Ltd., celebrated the 21st anniversary of the foundation of the company by a dinner, to which many of their friends, representative of the various branches of the electrical industry, were invited. A commemorative brochure by Mr. W. L. Randell, of which copies were handed to the guests, told the story of the origin of the firm, of which the late Robert F. S. Venner—an old Faradian, and one-time member of the staff of the Grosvenor Gallery works—was the head. The need for reliable time-switches made itself felt some 25 years ago, in connection with the two-rate system of charging for electricity; a solution of the problem was furnished by Mr. R. C. Graseby, who has ever since remained in charge of the technical work and has developed 30 standard types of time-switches, in addition to special types for special purposes, averaging one a week all the year round. No mechanical problem comes amiss to him, and his switches can do anything but talk. Mr. E. E. Sharp, his co-director, deals with the commercial side of the business, and has travelled in almost every country, invariably opening up new fields and extending the company's circle of friends.

The policy of the company from the first has been to place quality before price; experience has shown that a time-switch, to be of use, must be reliable and trustworthy above all things, and no variation from that ideal has been permitted. Inside the works no less attention is given to securing the comfort and satisfaction of the employés, with whom a close and cordial relationship is maintained, and who are made to feel—by practical participation in the profits—that they have a stake in the business.

At the dinner Mr. R. C. Graseby (managing director) presided, and, after the toast of "The King" had duly been honoured, Mr. J. W. BEAUCHAMP (director, E.D.A.) proposed "The Firm." He said the firm had applied modern commercial methods and modern scientific methods to what was, perhaps, the oldest mechanical contrivance in the world—the clock—and they had done it with very great success. He knew that the association between Mr. Graseby and Mr. Maydwell (the foreman) and the staff was a very happy one, and he felt that they had managed to recapture the old Guild feeling which was reflected in the very excellent quality of the work turned out by the firm. Mr. Sharp was famous throughout the industry for his contact method of salesmanship, and he particularly wished to thank him for the very unselfish, far-sighted and whole-hearted sort of E.D.A. work which he had been doing for a long time.

Mr. P. A. MAYDWELL, responding on behalf of the employés of Venner Time Switches, Ltd., said they had many privileges: there was a generous bonus system; they were paid for a week's holiday every year, and for all Bank Holidays, and there was an annual outing entirely at the expense of the firm. In case of sickness the men were paid up to two weeks in one year. The staff all felt that the firm's interests were their interests and *vice-versa*.

Mr. R. C. GRASEBY, who followed, said the firm started in a small way, but to-day it was making a range of time-switches from 1 ampere to 1,000 amperes and a voltage range from 6 to 6,600 volts, having operating times ranging from 24 hours to every few seconds. This apparatus had to be made as good as it possibly could be. Quality had been the aim all the time. The firm had not been satisfied with going out for the home trade; it had gone out into the whole world for markets, and had been able to meet competition comfortably and easily. The results of Mr. Sharp's visits overseas were always very beneficial, not only to the firm but, he believed, also to the industry as a whole.

Mr. E. E. SHARP proposed "The Electrical Industry," remarking that such a gathering meant that good craftsmanship and generous dealing were still appreciated by those whose opinions were worth having. Referring to the British Industries Fair, he said it seemed to him an extraordinary thing to hold such an important Fair in February; they could not expect people who lived in sunny climates to come here at such a period of the year. If they held the Fair in May or June they would be so inundated with visitors that London would be the only place to hold it, because of the hotel accommodation. They were gathering their forces together for one of the greatest advances ever experienced; they could all be happy that the working of the Electricity Act of 1926 had been placed in such thoroughly competent hands.

Mr W. W. LACKIE, C.B.E. (an Electricity Commissioner), responding to the toast, said that the representatives of the electrical industry present heartily congratulated the company, and hoped that its prosperity would be maintained during the next 21 years. They were a law-abiding nation, and he felt sure that, now the 1926 Act was on the Statute Book, they would all do everything in their power to help the work of the Central Electricity Board, so that the electricity supply of this country might be the success they all wished it to be.

Mr. J. R. BROOKE, C. B. (Secretary, Central Electricity Board), also replying to the toast, congratulated the firm upon attaining its majority. The Board hoped in a very short time to win the right to recognition as part of the electrical industry of this country, by having rendered to it really valuable service.

# Published Specifications.

**Compiled expressly for this journal by a firm of Chartered Patent Agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.**

### 1925.

23,665. "Sound-recording and sound-reproducing instruments." Standard Telephones & Cables, Ltd. (formerly Western Electric Co., Ltd.). May 29th, 1925. (242,657.)

24,371. "Sparking plugs for internal combustion engines." A. E. Macdonald. September 30th, 1925. (268,397.)

24,425. "Wireless direction-finding equipment." H. V. Flinn. October 1st, 1925. (268,398.)

24,672. "Thermionic discharge devices." Edison Swan Electric Co., Ltd. October 3rd, 1924. (240,862.)

24,673. "Metal mirrors within electrolonic discharge tubes." Edison Swan Electric Co., Ltd. October 3rd, 1924. (240,863.)

30,497. "Rectifiers for alternating current." E. S. Rogers. February 23rd, 1925. (247,920.)

30,741. "Starting devices for alternating-current motors." W. A. Boulting and A. Williams. December 5th, 1925. (268,412.)

30,797. "Variable electric condensers." S. A. Lamplugh, Ltd., and J. S. Spittle. September 3rd, 1926. (268,413.)

32,414. "Electric cables." Macintosh Cable Co., Ltd., and A. W. Williams. December 23rd, 1925. (268,418.)

32,880. "Wireless cabinets and aerials." C. R. Williams. December 30th, 1925. (268,424.)

32,918. "High-pressure system for electrolytic processes, more especially for the production of hydrogen and oxygen." J. E. Noeggerath. December 30th, 1925. (268,426.)

32,939. "Thermionic vacuum tubes and like vacuum apparatus." J. K. Im Thurn and H. Morris-Airey. December 30th, 1925. (268,428.)

### 1926.

2. "Electric plugs." W. J. Line. January 1st, 1926. (268,433.)

192. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., A. G. Salisbury, and J. Hutt. January 4th, 1926. (268,446.)

313. "Method of electrically measuring by means of a Wheatstone bridge." A. Ulitovsky and G. Sokolov-Vishnevsky. January 5th, 1926. (268,453.)

588. "Construction of electrical push-button switch." H. J. Bradbury. January 8th, 1926. (268,457.)

624. "Electric inductance coils." Siemens Bros. & Co., Ltd., and C. R. Riber. January 8th, 1926. (268,458.)

981. "Means for preventing short circuits to earth in overhead electric wires." British Insulated Cables, Ltd., and J. Nelson. January 13th, 1926. (268,463.)

1,257. "Holders or supports for thermionic valves." G. Campbell. January 15th, 1926. (268,468.)

1,289. "Thermally-actuated electric switches." Deutsche Gasgluhlicht-Auer Ges. August 3rd, 1925. (Patent of addition not granted.) (256,171.)

1,634. "Construction of cabinets and framework of wireless receiving sets." G. W. Walton and General Radio Co., Ltd. January 20th, 1926. (268,475.)

2,650. "Electric protective devices." British Thomson-Houston Co., Ltd., H. Trencham, and H. S. Petch. January 29th, 1926. (268,485.)

4,006. "Electrically-driven lawn mowers." Ransomes, Sims & Jefferies, Ltd., and W. S. Murdoch. February 11th, 1926. (268,504.)

4,995. "Electrical remote-control systems." General Electric Co., Ltd., and J. E. Collyer. February 22nd, 1926. (268,515.)

6,087. "Coil holder for wireless purposes." F. Scammel. March 4th, 1926. (268,528.)

6,182. "Geared variable condensers for wireless." F. Harwood, A. Sykes, and F. Needham. March 5th, 1926. (268,530.)

6,314. "Switching devices." International General Electric Co., Inc. March 21st, 1925. (240,499.)

6,403. "Compensated alternating-current electric motors." Deutsche Werke Akt.-Ges. March 6th, 1925. (248,775.)

6,556. "Control of electric circuits." General Electric Co., Ltd., W. Royle, and L. N. Jones. March 9th, 1926. (268,532.)

7,180. "Impulse transmitters for automatic telephone systems." Sterling Telephone & Electric Co., Ltd., N. Blades, and L. V. Marks. March 15th, 1926. (268,538.)

7,187. "Low-frequency transformers." Falk, Stadelmann & Co., Ltd., and F. S. Stuckey. March 15th, 1926. (268,539.)

8,096. "Arrangement for the reception and reproduction of sound oscillations and their transformation from and into electric currents." W. Hahnemann. March 31st, 1925. (250,221.)

8,211. "Electric steam boiler." E. Schleck. March 25th, 1926. (268,546.)

10,728. "Protection of electric systems against excess voltages." International General Electric Co., Inc. April 23rd, 1925. (251,292.)

11,194. "Electron discharge devices." British Thomson-Houston Co., Ltd. April 28th, 1925. (251,635.)

11,532. "Radiogoniometers and circuits for use therewith." E. Bellini. May 8th, 1925. (251,984.)

12,107. "Coarse and fine adjustment devices, more particularly for use with wireless components." E. T. Bennee and Ormond Engineering Co., Ltd. May 10th, 1926. (268,568.)

13,118. "Electric lampholder." H. E. Ashdown. May 25th, 1926. (268,573.)

13,181. "Impulse transmitters for use in telephone or like systems." Coventry Automatic Telephones, Ltd., and J. E. Colyer. May 25th, 1926. (268,577.)

14,763. "Reflectors for electric fires and radiators." H. H. Berry. June 11th, 1926. (268,592.)

### 1927.

598. "Electric ignition apparatus for internal-combustion engines." Perrem Ignition & Electric Co., Ltd., and F. C. Perrem. January 8th, 1927. (Addition to 266,174.) (268,707.)

# Trade Mark Applications.

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from the dates given. In the case of foreign applications the names and addresses of the British representatives are also given:—

**April 13th.**

Electrolux. No. 476,992. Class 6. Machinery of all kinds. No. 469,786. Class 18. Refrigerators and cold storage chambers.—Electrolux, Ltd.

**April 20th.**

Hydra (lettering and design). No. 472,069. Class 8. Electrical condensers, &c.—Gesellschaft Hydrawerke, 18, Windscheidstrasse, Charlottenberg, Berlin. (Boult, Wade & Tennant, 112, Hatton Garden, E.C.1.)

Lebrenco. No. 472,379. All goods in Class 8.—W. H. Le Breton, trading as the Le Breton Engineering Co., Windsor House, Victoria Street, S.W.1.

Tonisator. No. 475,860. Class 11. Electric apparatus for surgical and curative purposes.—Adolf Halpern, 10, Hegergasse, Vienna. (Haseltine, Lake and Co., 28, Southampton Buildings, W.C.2.).

# New Work for Contractors.

**Particulars of new works and building schemes for the use of electrical installation contractors in search of work and all interested in the sale of electrical and allied plant and other products.**

***Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.***

ALEXANDRIA (Dumbarton).—Artificial silk factory for the Scottish Artificial Silks, Ltd., Edinburgh.

ALSTON.—School, for Cumberland E.C.; director of education, Carlisle.

AUSTRALIA (Sydney).—Refuse destructor for the Municipal Council. Specifications from J. Davis, consulting engineer, 100, Victoria Street, London, S.W.1.

BARNSLEY.—Three new elementary schools; Education Committee.

BEDLINGTONSHIRE (Northumberland).—50 houses, Cambois Estate; U.D.C. surveyor.

BOURNEMOUTH.—Extensions, highways depôt, for Corporation; F. W. Burton. Business premises and flats, Exeter Road; Rebbeck Bros. Shops and houses, Wimbourne Road; F. Moorman.

BRADFORD.—Extensions to artificial silk factory for Brysilka, Ltd., Apperly Bridge.

BRAYFORD (Barnstaple).—Wesleyan church and schools; Mr. Copp, architect, Strawberry Cottage, Bideford.

BRIGHTON.—Memorial hall (£6,500); Rev. Canon F. C. N. Hicks, vicar.

BRIGHTON.—Additions to Dorset Garden Wesleyan Church (£14,000); trustees.

BURNHAM-ON-SEA.—Water supply scheme, with electrically-driven plant, Brent Knoll station, for the U.D.C.; Willcox & Raikes, consulting engineers.

CHAWLEY (Oxford).—Saw mills and engine house, for the Chawley Timber & Brick Co.; Mr. Reynolds, manager.

CHESTER-LE-STREET (Co. Durham).—Additional 42 houses, for the R.D.C.; estates surveyor.

COATBRIDGE.—Tearooms (£2,000) for A. B. Brown, Ltd., bakers; the manager.

CONISBOROUGH (Yorks).—Colliery engine house, Cadeby Colliery (several thousand pounds); Mr. Young, manager.

CROYDON.—Wesleyan schools (£8,000), with electric lighting; Alder & Turrill, architects; Truett & Steel, Ltd., builders.

DAGENHAM.—8th and 9th elementary schools; Essex Education Committee.

DERBY.—Housing scheme (88), Derby Lane site, for the T.C.; C. A. Clews, borough surveyor, Babington Lane. Boys' secondary school. Elm Tree House estate, for the borough E.C.; Macpherson & Richardson, architects, Tenant Street.

DORCHESTER.—Grammar school, Manor Road; governors.

DURHAM.—Houses (£59,078), for the T.C.; Mr. Elcoat, builder.

EASTLEIGH.—Schools, for Hants E.C.; director of education, Winchester.

EDINBURGH.—Super-cinema to seat 3,000; F. A. Lumley, proprietor.

ELLESMERE PORT.—Schools (800 places), for the Cheshire E.C.; F. A. Browne, county architect, Newgate Street, Chester.

FIFESHIRE.—Church at Rosyth (£6,200); Rev. William Stephen, Inverkeithing.

GLASGOW.—Shopping centre, High Carntyne estate; housing director.

GLOUCESTER.—Re-erection of printing works, Bell Lane, for the Crypt House Press, Ltd., and the Gloucestershire Chronicle, Ltd. (between £25,000 and £30,000).

HAMILTON.—Fire station; the burgh firemaster.

HEMEL HEMPSTEAD.—Additional housing scheme (48) for the T.C.; borough surveyor.

HORNCHURCH (Essex).—Houses (38). Rainham Road, for T. England.

HORNSEA.—Extensions, municipal buildings; U.D.C. surveyor.

HULL.—Electric lighting, Park Avenue School; education director. Re-erection of portion of oil cake mills, electrically equipped, Maxwell Street, Stoneferry, for Spencer, Isaac & Co. (several thousand pounds).

IRISH FREE STATE (Dundalk, Co. Louth).—54 houses for the U.D.C.; M. Sellars, Council surveyor.

(Thurles, Co. Tipperary).—Technical school for the North Riding Tipperary Joint Technical Committee; V. Kelly, architect, 4, Grafton Street, Dublin.

KIRKCALDY.—286 houses for District Committee (£120,000); county clerk.

LEICESTER.—Church hall (£7,000), Saffron Lane Estate, for the Wesleyan trustees; secretary.

LONDON (Barking, E.).—Chemical store, Abbey Road; Chemical Supply Co., Ltd. Infectious diseases hospital, for the U.D.C.; H. Hargreaves, clerk.

(Ilford, E.).—High school for girls; Essex Education Committee. Shops, Beehive Lane and Eastern Avenue; P. E. Brand, Ltd.

(West Ham, E.).—School, South Hallsville (£16,000), with electrical and heating work, for the borough E.C.; education architect.

(Greenwich, S.E.).—Welfare centre, with electrical and heating work (£3,700), for the T.C.; borough surveyor.

(Sydenham, S.E.).—Additions, Technical Institute, Sydenham Hill Road; W. J. Dixon & Sons.

(Westminster, S.W.).—Buildings, Vandon Street; T. H. Mawson & Sons.

MACCLESFIELD.—Block of offices, for the Cheshire Building Society; F. C. Sheldon, architect, 7a, King Edward Street, Mineral water works, Great King Street, for G. Ray & Sons, Ltd.

MANCHESTER.—Bus garage extension, Queen's Road; city architect.

MIDLOTHIAN.—Extensions at West Calder Roman Catholic school (£4,800), and extensions at West Calder High and Bonnyrigg schools; clerk, School Management Committee, West Calder.

MITCHAM.—Wireless transmitting station, for the Air Ministry.

NELSON.—Secondary school; S. Wilkinson, country architect, 16, Ribblesdale Place, Preston.

NEWARK-ON-TRENT.—Extensions to Kelham Hall (£75,000), for the Society of the Sacred Mission; Moss & Son, builders, Loughborough.

NORTHAMPTON.—Schools, Far Cotton (£16,513), for the Borough E.C.; director of education.

OLD HILL (Staffs.).—Re-erection of brush factory, for Hector Bird.

PRESTWICH (Ayrshire).—Housing scheme (76), for the T.C.; burgh surveyor.

RICHMOND (Surrey).—Central schools (£35,000), for the borough E.C.; the clerk.

SALISBURY.—Administration block extensions, for the Joint Isolation Hospital Committee; T. Walker, county architect, Trowbridge.

SANDBACH (Cheshire).—Cinema, for Beech & Smith; J. R. Price, architect.

SOUTH AFRICA (Cape Town).—Housing schemes (£160,000); city engineer. Market extensions (£58,000) for Corporation; J. Rubbi.

SOUTHEND-ON-SEA.—Knitting factory, electrically equipped, The Mall, Southchurch, for Parsons Bros., Whitelands.

STAFFORD.—Extensions to market hall (£7,500), for the T.C.; borough engineer.

STOCKPORT.—Operating theatre, for the infirmary governors; Worthington & Sons, architects.

SUTTON.—34 houses, Ridge Road; U.D.C. surveyor.

SWADLINCOTE.—Housing scheme (60), Gresley, for the U.D.C.; surveyor.

SWANSEA.—Hall and shops, Portland Street and Park Street; A. Ruck. 43 houses, Grenfell Park estate; Jones Bros.

THORNABY-ON-TEES.—Houses (69), for the T.C.; Stephen Coates, Ltd., builders, Middlesbrough.

TREDEGAR.—Additional 100 houses, Ashvale, for the U.D.C.; surveyor.

WARWICK.—100 houses; borough engineer.

WEST CALDER.—Extensions to schools (£4,800), for Midlothian E.C.; director of education, Edinburgh.

WEST SUSSEX.—Three ultra-violet ray stations; West Sussex Education Committee and the British Red Cross Society.

WICKERSLEY.—School, Sunnyside, for West Riding E.C.; education architect, County Hall, Wakefield.

WIGAN.—Town hall extensions (£12,084), for the T.C.; H. B. Donald, borough engineer. Church, Newtown (£8,000), for the Wesleyan trustees; Rev. Francis G. Gray.

WILLINGTON (Co. Durham).—Additional housing scheme (30), for the U.D.C.; surveyor.

WOMBWELL (Yorks).—Housing scheme (66), King's Road, for the U.D.C.; D. H. Roberts, architect, Park Street.

WORKSOP.—Joint municipal offices, U.D.C., R.D.C., and Board of Guardians.